COMPUTER CATALOGUING
AND
INDEXING SURVEY

Summary

by

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INTRODUCTION

The 200-page report by JEM Research of Victoria, B.C., represents the culmination of four months of intensive research of both the field and literature about the state of information dissemination regarding educational software.

Included in the project is an analysis of educational software information available to educators, an assessment of needs as expressed by educators throughout Canada, and the generation of an implementation plan designed to make the two more congruent.

JEM Research, in this report, addressed the problems inherent in the collection, organization, and dissemination of information about educational software and suggested a structure for effectively accomplishing these activities. This Staff Summary combines the report's Executive Summary with the researchers' recommendations to the Ministries of Education of Alberta, British Columbia, New Brunswick, Northwest Territories, Nova Scotia, and Ontario.

PROCEDURE

In order to arrive at the recommendations, the nature of available information about educational software was examined with reference to quality, quantity, availability, and appropriateness.

Requirements (as expressed by educators at all levels across Canada) of a variety of users--teachers, students, librarians, resource personnel, and administrators--were considered.

The consensus was that current information capabilities--software catalogues, vendor publicity materials, and educational resource centers--do not satisfactorily meet the user needs.

Users expressed their opinions regarding the "state of the art" of information organization regarding educational software:

1. dissatisfaction with the present quality, quantity, and format of information;
2. frustration with the dearth of coordinated resource and information sharing among schools, boards, regions, and provinces;
3. certainty that educators' workloads and lack of funding preclude their ability to make a concerted effort to organize the information to meet their needs;
4. anger, in light of the lack of funding, at the duplication of work and expense in the few attempts to provide the information, the results of which are often inadequate;
5. concern that lack of easily-accessible information will inhibit and discourage the broader educational use of software, similar to the disenchantment with educational television;

6. desire for an authority to assume the initiative and provide the direction and funding required to remedy the problem and ameliorate the user concerns;

7. desire for real provincial cooperation in this matter (general pessimism exists, due to the political-educational structure).

Educators expressed their frustration that, although the most cost-efficient and least duplicative arrangement for information-sharing seemed to be provincial cooperation under a coordinating body, this kind of national coordination was not likely to happen. They were nevertheless eager to contribute to the survey and analysis, since the discussions provided, in many instances, an opportunity for representatives of very different disciplines to discuss common concerns in instructional computing.

SOFTWARE REQUIREMENTS

The requirements as stated by the representatives included:

1. thorough descriptions of available materials;

2. standard descriptions which could be easily understood by all users;

3. easily-accessible descriptions available in one catalogue or accessed through a database;

4. evaluations;

5. interface and comparability with descriptions of other educational resources.

Field discussions were most often concerned with two notions:

1. the desirable elements or fields of a standard description, and

2. the method of information gathering and dissemination.

Most people interviewed agreed that a centralized system of one sort or another would be the most effective, but questioned the possibility of a coordinated national effort, given the structure and history of educational responsibility in Canada.

Additionally, some individuals questioned the blanket applicability of a centralized system, given regional requirements, geographic inhibitors to full participation in such a system, and fears of unequal treatment of the "poorer" and less vocal provinces.

Literature on educational software organization is minimal, but literature on the treatment of non-print materials is abundant. Most of this literature underlines the importance of standardization and cooperation in all of data collection, format, and distribution. Both Great Britain and the United States have established major clearinghouses for reliable information about non-print educational resources.

Current computer technology enables networking by resource and information specialists. Networking implies a cooperation by people, groups, or sections in sharing effort and cost, while maintaining control over matters of individual concern. Networking is a compromise between the bureaucratic problems created by a central agency's attempting to perform all functions for all groups, and the expense of numerous organizations duplicating the same tasks on the same materials.

The establishment of an information-sharing network would be facilitated by the following steps:

1. Determine procedures and funding for the provision of some form of coordination of information dissemination activities regarding educational software.

2. Begin collecting standardized descriptions of educational software packages.

3. Decide on data elements or fields to be used in describing educational software.

4. Circulate suggested fields and rationales to computer-using educators for comments and possible revision.

5. Decide which materials are to be included in the software database.

6. Design an organizational scheme to collect descriptions of educational software.

7. Decide what products are to be generated by the database.

8. Select an appropriate cataloguing code.

9. Select an indexing method appropriate in both an on-line and manual search situation.

10. Select a delivery system which can:
    a. create a database of descriptions of educational software;
    b. provide cataloguing services;
    c. generate catalogue cards or COM;
    d. generate a quality print catalogue as a selection tool;
    e. provide on-line access to database records;
    f. provide expertise, experience, and guidance in database creation;
    g. accommodate PRECIS indexing, if required;
    h. accommodate additional files of information in an educational software database.

11. Analyze the cost, procedures, and implications of a delivery system using FORMAT, PRECIS, and UTLAS, by convening a meeting of the Steering Committee for this Stage 1 report, the coordinating agency, the users and holders of these three formats, users of MARC format, and the JEM research team.

12. Accommodate the use of both official languages in designing the information-sharing network.

RECOMMENDATIONS

The recommendations for a plan of action are based on two notions essential to the solution of the educational software information problem:

1. There should be a standard descriptive format which can be used to describe all educational software. This format should provide data relevant to the needs of all users--students, teachers, administrators, and resource personnel--and should conform to guidelines which anticipate or accommodate not only present, average examples but also future and exceptional examples.

In a standard description, 26 fields of information should be used:

Accession Number
Package Title
Series Title
Edition
ISPN
Author
Producer
Distributor
Copyright Date
Restrictions
Cost
Computer Model
Memory
Operating System
Language
Storage Medium
Peripherals
Descriptors
Classification
Application
Instructional Strategy
Grade Level
Special User
Abstract
Evaluation Stage
Display Language

The researchers also suggest that cataloguing methods should include both library and vendor catalogues, as a library tool and as a purchase tool respectively. The information provided by the library catalogue would help the user determine:
- whether the collection contains a specific item;
- which works by a particular author are in the collection;
- which editions of a particular work are in the collection;
- what materials a collection has on a specific subject.

The researchers note problems school libraries currently have with the organization of non-print materials, such as:
- lack of a link between the classification system and an accession number;
- lack of full and comprehensive cataloguing cards;
- lack of a comprehensive, multiple-type classification system; and
- lack of consistent, uniform cataloguing codes.

Vendor catalogues should contain information about products available for purchase, but their usefulness is impaired by:
- insufficient information;
- questionable value judgements inherent in the subjective nature of each;
- inadequate indexing systems which require the reading of every description to determine appropriate material;
- lack of standard formats between and within catalogues, making comparison extremely difficult; and
- profusion of different catalogues.

A catalogue of educational software should:
- contain public domain and commercially-produced software;
- provide thorough, standard descriptions;
- indicate what educational software is currently available;
- be updated yearly;

- provide suitable indexing by subject;
- provide easily-understood indexing;
- provide information appropriate to decision-making on suitability, i.e., specifications, cost, availability, topics;
- be able to be produced economically and efficiently.

In addition, the researchers describe suitable indexing methods which should be adopted in establishing a network: library indexing, print catalogue indexing, ERIC, and PRECIS.

Materials in libraries are most often indexed by title, author, and a subject heading. This method can create problems as a result of the growing number of subject headings for such a rapidly-growing area as educational software:

- subject terms become outdated because of new educational jargon;
- terms may be too specific or not specific enough;
- "see" and "see also" references need to be continually updated, also, because of the growth in vocabulary.

Print catalogue indexing may be inadequate because of a lack of cross-referenced or comprehensive subject headings and subject, grade level, and hardware specifications.

ERIC has created its own vocabulary of keywords and a thesaurus, which provides an alphabetic listing of all terms. The thesaurus compares old and new terms, and provides a rotated descriptor display. The one drawback to ERIC is that it is designed for machine access, whereas at this time, the print catalogue is the most accessible.

PRECIS (Preserved Content Indexing System) produces a printed index for manual retrieval and accommodates the potential for machine access. PRECIS is a machine-produced alphabetical indexing system, based on a natural-language-based syntax. PRECIS seems most appropriate for present needs of users of educational software in that it:

- caters to both manual and machine retrieval systems;
- can be used to reflect Canadian terminology;
- has been utilized in bilingual applications;
- has readily available software in a Canadian system (UTLAS);
- has proven useful in indexing non-print materials generally and educational software specifically.

2. The system should
   a. at all times preserve the quality of these descriptions by rigorous adherence to standards, while compromising, to accommodate unique requirements; and
   b. take advantage of the cost and effort economies derived from a cooperative network.

The 12-point system outlined above would involve cooperative collection and organization of information, and would be under the direction of a coordinating agency with two responsibilities:

a. representation of all user needs, and
b. maintenance of the quality and integrity of the standard descriptions which will form the database.

It is more than likely that these responsibilities will run counter to one another from time-to-time. However, a coordinating agency which is intimately involved in the generation of descriptions and the various needs of all users is the best vehicle to resolve conflicts of interest.

The major advantages of a coordinated information sharing effort accrue during the gathering and organizing of the information. The information can be easily disseminated by individual provinces or regions once they have the original, standardized data. This individuality would allow network participants to distribute information in the form which best accommodates their own educational resource requirements.

Recommendation 1: That a coordinating agency be designated to complete the 12-point implementation plan outlined above, and described in the JEM Research report.

Recommendation 2: That a database of standardized educational software descriptions be established in order to provide a basis for:
a. a selection tool to aid educators in purchasing educational software; and
b. central cataloguing records.

Recommendation 3: That the 26 fields described on Page 4 of this report constitute the basis for a standardized description of educational software.

Recommendation 4: That all software materials described in the database should be:
a. educational in nature (relating to the fields of education, teaching, and schooling);
b. operationally ready;
c. free of non-Canadian material inappropriate for Canadian students;
d. available for distribution in Canada.

Recommendation 5: That software material be subjected to a four-stage evaluation:
a. minimum entrance criteria, as suggested in Recommendation 4;
b. cross-reference to evaluations published in the literature or available from evaluation organizations;
c. comprehensive evaluations by trained subject specialists using a standard evaluative instrument;
d. designation of provincial authorization or prescription.

Recommendation 6: That the database contain at least two separate files--a Descriptive File and an Evaluative File. Records for the Descriptive File should be given immediate priority.

Recommendation 7: That the cooperation of producers of commercial educational software be sought in collecting descriptions about their products.

Recommendation 8: That the cooperation of provincial organizations of computer-using educators or some other provincial or regional interest group be sought in the task of collecting descriptions of public domain software originating in their provinces.

Recommendation 9: That an Input Form and accompanying guide, based on the final list of agreed fields of an educational software description, be designed and distributed to the producers and provincial groups to ensure that all descriptions collected appear in a standard format.

Recommendation 10: That the coordinating agency be responsible for collection, completion, and initial processing of Input Forms, as well as encouraging ongoing submission of such forms.

Recommendation 11: That a print catalogue which educators can use as a selection tool, and cataloguing records which can be used by librarians to organize collected resources be developed with the utmost urgency.

Recommendation 12: That, with reference to the products in Recommendation 11, on-line cataloguing records and an on-line product catalogue be developed with all speed. They constitute lower priority in terms of immediate availability to educators, but equal priority in terms of development and delivery system consideration.

Recommendation 13: That the cataloguing rules for machine-readable data files be adopted.

Recommendation 14: That a keyword indexing method be utilized and that serious consideration be given to a PRECIS-type management system of the keywords or descriptors.

Recommendation 15: That detailed analysis be done to determine the cost, procedures, and implications of a delivery system which makes use of the combined resources of FORMAT (National Film Board), PRECIS (University of Toronto), and the cataloguing services of UTLAS.

Recommendation 16: That the language of each description reflect the display language of the educational software.

Limited copies of the full report are available from the Planning & Research Branch of Alberta Education, 9th Floor, Devonian Building, 11160 Jasper Avenue, Edmonton, Alberta, T5K OL2 (Telephone 403/427-2991).

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Joint Educational
Management Research

EDUCATIONAL SOFTWARE:

A Canadian Plan for Information Sharing

(Phase 1)

VOLUME I

Joint Provincial Courseware Cataloguing and Indexing Project

Prepared for the MINISTRIES OF EDUCATION of:

- ALBERTA
- BRITISH COLUMBIA
- NEW BRUNSWICK
- NORTH WEST TERRITORIES
- NOVA SCOTIA
- ONTARIO

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EXECUTIVE SUMMARY

This report represents the culmination of four months of intensive research of both the field and literature pertaining to the state of information dissemination regarding educational software.

The scope of the project included an analysis of educational software information currently available to educators, an assessment of the needs of users in this regard as expressed by educators throughout Canada, and the generation of an implementation plan designed to make the two more congruent.

The report addresses the problems inherent in the collection, organization and dissemination of information about educational software and suggests a structure for effectively accomplishing these activities. The following summarizes the findings and recommendations contained in the report.

The nature of available information about educational software was examined with reference to:

a) quality;
b) quantity;
c) availability; and
d) appropriateness to the needs of users in the educational field.

The requirements of a variety of users as expressed by educators at all levels across Canada were considered, including those of teachers, students, librarians, resource personnel and administrators.

The general consensus is that current information capabilities, as manifested by software catalogues, vendor publicity materials and educational resource centres, do not satisfactorily meet the needs of users of this information.

Users expressed the following opinions concerning the "state of the art" of information organization regarding educational software:

a) a dissatisfaction with the present quality, quantity, and format of information;

b) a frustration with the dearth of coordinated resource and information sharing between schools, boards, regions, and provinces;

c) the certainty that educators' current workloads and lack of funding preclude a concerted effort on their part to organize this information to accommodate their needs;

d) anger, during these times of restraint and cutbacks, at the duplication of work and expense involved in the few existing attempts to provide this information - the results of which are often less than adequate;

e) a real concern that lack of easily accessible information will inhibit and finally discourage the broader educational use of software (Comparisons were often made to the "failure" of educational television, a failure which was attributed not to the nature of the medium, but rather to the lack of adequate support to educators in terms of in-service training and information provision. The suggestion was made by many that, unless this support problem is addressed, microcomputers will join television in the schools as "dust collectors");

f) a desire for some authority or organization to assume the initiative and provide the direction and funding required to remedy the educational software problem;

g) confusion as to the most appropriate vehicle for this initiative - teachers suggested boards of education; boards suggested ministries or departments of education; administrators suggested universities, interest groups or computer-using groups; computer-using groups suggested a national coordinating group (National Library, Council of Ministers, National Science Council);

h) a desire for, but general pessimism at the prospects of, real provincial cooperation in this or any educational matter due to the present political - educational structure (although many commended the provincial cooperation manifested in the initiative and funding for this very project and hoped such cooperation might establish a precedent).

The field discussions in the provinces provided a forum for educators to express their frustration that, although the most cost-efficient and least duplicative arrangement for information sharing seemed to be provincial cooperation under the auspices of some kind of coordinating body, this kind of national coordination was not likely to happen. Many educators voiced resignation to the inevitable and repeated "reinvention of the wheel".

Notwithstanding this skepticism regarding the possibility for improvement, educators were nevertheless eager to voice opinions regarding the educational software situation. Field dicussions provided, in many cases, a first opportunity for individuals representing very different disciplines, but sharing a common interest in instructional computing, to meet to discuss common concerns.

These individuals had very definite ideas about what they wanted with reference to information about educational software. These requirements included:

a) thorough descriptions of available materials (teachers especially stated numerous specific types of information they felt were lacking or inconsistently provided in descriptions);

b) standard descriptions which could be easily used and understood by teachers, administrators and students alike;

c) easily accessible descriptions which might be available in one comprehensive catalogue or accessed through a database (Many educators, although unaware of the technicalities in the delivery of this kind of access were familiar with the concept of on-line databases - most were aware of ERIC - and indicated an active interest in using this form of information technology);

d) some type of evaluative information (Many were aware of the problems implicit in obtaining quality, standardized evaluations);

e) some interface with descriptions of other educational resources. Librarians and resource people in particular questioned the wisdom of treating this medium any differently than other educational resources, although they acknowledged that current treatment of other educational resources (non-print material specifically) was often less than adequate.

In summary, field discussions were most often concerned with two notions. The first concerned the desirable elements or fields of a standard description. The second concerned the more complex issue of how this information might be initially gathered and subsequently disseminated to users. Most agreed that a centralized system of one sort or another would be the most effective, but also realized the traditional problems associated with a coordinated national effort given the structure and history of Canadian educational responsibility.

In some provinces, individuals acknowledged the advantages of a centralized system, but for various reasons were unprepared to participate in a cooperative arrangement. These reasons included such concerns as the ability of a cooperative network to truly meet the unique needs of regional users; problems posed by geographic distance in allowing full and active participation in a central coordinating body; fears that the needs of provinces with limited funding and resources would not be heard by those provinces who possess more resources and who may be more aggressive in the expression of their needs.

Literature on the subject of educational software organization is minimal - reflecting the newness of this area. There is however, a substantial body of literature which deals with the treatment of non-print materials, a category of learning resources within which software may be included. Most of this literature underlines the importance of standardization and cooperation in both data collection, format and distribution. It should be noted that both Britain and the United States have seen fit to establish major centres or clearinghouses as viable collectors and purveyors of reliable information about non-print educational resources. (See Section 2.3.6 for a discussion of the American database NICEM).

Current computer technology has made possible the option of networking to resource and information specialists. Networking implies a cooperative effort by individual groups or nodes for the purpose of, where feasible, sharing effort and cost, while at the same time, maintaining control over matters of individual concern. This represents a compromise between the large, bureaucratic and administrative problems posed by a central agency which attempts to perform all functions for all groups and the expensive and duplicative alternative of numerous organizations performing the same tasks on the same materials. Section 4.0 of this report suggests alternatives which make possible the establishment of an information sharing network.

The recommendations for a plan of action (see Section 4.0) are based on two notions which are essential to the solution of the educational software information problem.

The first is the need for a standard descriptive format of considerable integrity which may be used to describe all examples of educational software. This format should provide data relevant to the needs of all users - students, teachers, administrators and resource personnel and should conform to organized and predetermined guidelines which anticipate or accommodate not only present, average examples, but future and exceptional ones as well.

To this end, Section 3.0 of the report suggests 26 fields of information which should be used in a standard description and Sections 2.1.1 and 2.2.4 suggest standard cataloguing and indexing methods to be adopted.

Secondly, it is crucial that the system which will make available a collection of these descriptions should:

a) at all times preserve the quality of these descriptions by a rigorous adherence to standards set out, while allowing where possible for compromise in order to accommodate requirements unique to some users;
b) take advantage of the cost and effort saving potential to be derived from a cooperative network.

The report, therefore, outlines a system which involves cooperative collection and organization of information, under the direction of a coordinating agency which will have two responsiblities:

a) representation of all user needs; and

b) maintenance of the quality and integrity of the standard descriptions which will form the database.

It is more than likely that these responsibilities will run counter to one another from time to time. However, a coordinating agency which is intimately involved in the generation of the descriptions on the one hand and also acquainted with the various needs of all users on the other is the best vehicle to resolve conflicts of interest which may arise as a result of these two concerns.

It should be noted that the major advantages of a coordinated information sharing effort accrue during the gathering and organizing of information. The dissemination process, on the other hand, could be easily performed by individual provinces or regions once they have been supplied with the original, standardized data. This would allow participants in the network to distribute information in the form which best accommodates already existing educational resource arrangements. Thus, those provinces which have integrated resource catalogues could incorporate the standard descriptions of software (or elements thereof) provided by the database into the form and style of their own catalogues. Similarly, provinces with educational databases could add the already gathered material to their own collections. Provision for this type of information integration has been made during the development of the 26 fields of information which will comprise the standard descriptions. This has been accomplished by incorporating the organizing principles upon which current provincial information disseminaton efforts are based (i.e. Library of Congress numbers, Sears subject headings, Delivery Decimal Classification, etc.).

Recommendation #1 of this report, which suggests the necessity of a coordinated information sharing venture between the provinces - to be managed through the auspices of an agreed coordinating agency, is fundamental to the entire plan as outlined in Section

4.0 of this report.

The report concludes with 16 basic recommendations, the combined significance of which suggest the establishment of a bilingual Canadian database of standardized descriptive information of educational software. The descriptions should adhere to the recognized standards of the Anglo American Cataloguing Rules (2nd ed.), MARC format and a PRECIS-like keyword indexing system. A possible delivery system is described which makes use of the combined resources of the National Film Board's FORMAT program and the cataloguing and database facilities of the University of Toronto Library Automation Service.

The database should generate a print catalogue, provide central library cataloguing records and eventually be available on-line. The database would give immediate priorty to purely descriptive information of both commercial and public domain educational software which met basic entrance requirements, with a view to providing evaluative information as it becomes available and feasible to do so.

Development and management of this information sharing venture would involve the cooperation of numerous provinces under the direction of a coordinating agency with the mandate to represent the needs of users and to protect the quality and integrity of information in the database.

In addition to these recommendations, Section 4.0 of the report provides a suggested sequence of steps to be taken in order to implement these recommendations and offers an analysis of the responsibilities, time and cost in establishing such a database.

It is hoped that this document will provide a working framework for discussion and action towards the development of a Canadian information sharing network which will provide educators with reliable, current educational software information and which might eventually be extended to include the full spectrum of educational resources information.

1.0 INTRODUCTION

A crucial obstacle to wider educational use of the computers is the dearth of information regarding adequate materials. In fact, the coordination of information in the field of educational computing is so poor that it is increasingly difficult to determine whether the "software crisis" now represents the real scarcity of good software or of information about existing material. A lack of documentation, validation and dissemination have been cited as factors contributing to the apparent scarcity. This lack of information is found in both administrative and instructional computing applications.

This project represents a coordinated recognition of and attempt to respond to a universal situation. The unusual complexity of the medium demands a more detailed analysis, both semantic and applied, of the components of the problem and the specific issues raised by each component. It is intended that the work will provide a coherent basis for subsequent development of an educational software database and delivery system.

1.1 Project Research Methods

This project involved consideration of a variety of disciplines including:

- Library Science
- Education
- Computer Technology
- Communications Technology

Extensive research in each of these areas was necessary in order to intelligently define and examine the original project problem. This research was initiated by a search of the literature with a focus on the following areas:

- on-line information retrieval
- cataloguing
- indexing
- computer retrieval
- library networking
- library automation
- software evaluation
- educational resources
- database management

(See Appendix III for a bibliographical review of documents, articles, books, etc. organized according to the above subject headings).

Comprehension and clarification of library, computer and educational resource terminology was essential for useful discussion of the various intellectual components of the project. A glossary of terms was generated and should be useful when reading the report. (See Appendix II)

Numerous field contacts with individuals and organizations (over 100 individuals, over 30 organizations, 11 departments of education) were made through a combination of visits across Canada, a plethora of phone calls and intensive communications by mail. The range of expertise consulted in this manner included:

a) librarians experienced in cataloguing or organizing educational resources
b) specialists in the field of computers in education (school and industry based)
c) research organizations involved in the collection/dissemination/evaluation of educational resource material at the provincial and school level
d) persons knowledgeable in the area of database management

(See Appendix I for a Contact Log.)

In addition to these initial contacts, further information was obtained from:

a) prominent library technicians in advanced areas of library automation and networking
b) publishers collecting or organizing education resources and/or computerized learning materials (See Appendix IV for examples of field formats)
c) companies and individuals producing software suitable for maintaining a database (See Appendix VII for description of some Information Retrieval Packages)
d) clearinghouses for educational software (See Appendix V)
e) clearinghouses for educational resources (See Appendix VI)

Finally, as stipulated in the terms of reference for the project, examples of evaluation methods appropriate for educational software were collected.

(See Appendix VIII.)

The JEM Project Team is grateful to the many individuals and organizations who gave their time and expertise so willingly. The results of this research represent a collaboration of effort and concern by many different subject specialists who are committed to the general notion of information sharing.

1.2 Definition of Terms

Precise definition of terms is crucial throughout this discussion. Indeed, misuse of terms and a super-abundance of overlapping (or vaguely defined) terminology has been a particular problem during the course of this research. In the interest of clarity it is desirable, at this point, to select an appropriate label for the medium with which we are dealing. Figure 1 is a mini-glossary of related but distinct terms which could be and, (depending on the literature), are used to signify this medium. Included are terms which are of varying degrees of appropriateness and terms which are clearly inappropriate but which nevertheless add to the confusion.

The original terms of the project designated courseware as the focal point. A thorough examination of the problem suggests that educational software is a more appropriate object of study for the following reasons:

1. The former is a subset of the latter and specific treatment of the unique characteristics of courseware runs counter to the requirement for a flexible method. Flexibility suggests deriving a general method which allows for varying degrees of specificity.
2. The preponderance of materials, for microcomputers in particular, does not exist in courseware form (i.e. a complete course of study). Although some users are more interested in promoting the concept of courseware (i.e. Ministries), lessonware represents a large enough bank of materials that it must be addressed if the information problem is to be solved for all users.
3. The distinction between lessonware and courseware can be seen as a somewhat arbitrary one by some groups and this distinction is not recognized by all groups.
4. There is a sufficient bank of materials which straddles these two concepts (lessonware and

courseware) so as to make user distinction difficult.

Having labelled our medium as educational software, we can address the initial definition of our task. The original title suggests an examination of "cataloguing and indexing systems." It was only after a reasonable degree of understanding was achieved of the various disciplines involved (library, education, computers, automation) that the inappropriateness or vagueness of these terms (cataloguing, indexing, systems) became apparent.

"Cataloguing" (in the traditional library sense) for educational software is so little practiced at present that a survey of methods is not particularly useful. However, there is a proliferation of "catalogues" (in the vendor sense) which purport to describe educational software. There is a requirement for both types of cataloguing (i.e. a library record for software held in a library collection and a browsing list of available software for educators).

"Indexing" refers to a complex process of supplying access points in an automated system and, in this context, is more appropriately termed an indexing language. Librarians, however, think of indexing as a process which relates (for instance) periodical literature to subject designations of one sort or other.

A "system", to computer enthusiasts, suggests a combination of hardware and software used to accomplish a task. To the uninitiated or those with more traditional vocabularies, "system" means a method or way of performing a task.

Given this confusion of terms due to their relative applications, it was decided to take the liberty of interpreting the overall problem and redefining the task. This does not represent a redefiniton of needs, but rather a rewording and clarifying of same. "Cataloguing" and "indexing", in their broadest sense, suggest the organization and dissemination of information. "Systems" suggests a method (automated or otherwise) of accomplishing a task. Consequently, we feel that "organization and dissemination of information about educational software" represents a more workable and appropriate definition of the task at hand than "cataloguing and indexing of courseware".

This rewording is not based solely on a semantic examination of terms. It also arises as a result of careful scrutiny of the overall problem and needs as reflected in the existing situation which prompted the project and the terms of reference of the contract.

Figure 1

EDUCATIONAL SOFTWARE - A GLOSSARY

Computerized learning materials -
Educational resources which require computer hardware in order to be utilized. Hardware may range from a microcomputer to a mainframe.

Computer programs -
A set of sequenced instructions which cause a computer to perform particular operations.

Courseware -
The software and all the supplementary print materials that constitute a complete course of study. Thus, a courseware package might include a magnetic tape or floppy disk, a videotape, a set of microfiche cards, and a set of printed materials; analogous to the long sequences of content in subjects of study that are now produced as textbooks; a package (a program or collection of programs) and its accompanying literature. The first two definitions originate in Ontario and seem specific to that location, the latter is the more generally understood meaning.

Educational software -
Computer programs designed to be used in an educational, instructional, or training setting.

Firmware -
Software instructions or data that are sorted in a fixed or "firm" way, usually implemented in a ROM, PROM, or EPROM, as opposed to software programs stored on paper or magnetic media and which must be

entered into the RAM memory of the computer to be used. Firmware is built into the computer.

Hardware -

Refers to the physical equipment, the actual nuts, bolts and wiring, that makes up a computer. If a particular bit of data manipulation is handled by circuitry rather than by a program, it is said to be "in hardware".

Lessonware -

Is defined as short computer programs dealing with particular topics or short sequences of content within courses of study.

Machine-readable data files -

Data stored on a variety of media. A collection of related records that are treated as a unit and represented in such a way that they can be read or translated by a machine.

Non-print media/resources/material -

Materials which involve media other than the print medium. Many graphic materials are actually printed, but the term non-print has come to mean those materials which are not textual or book-like in nature.

Software -

The word software refers to a computer's programs. If a particular bit of data manipulation is done through a program rather than by special circuitry, it is said to be "in software".

Utilities -

A utility program is a program made available by the operating system to save programmers the necessity of writing their own programs to do often needed tasks.

1.3 Summary of Educational Software Situation

The educational software situation may be characterized by stating that there exists a proliferation of potential educational materials (software) authored by educators and non-educators; produced commercially and privately; distributed through complex or simple channels for sale or sharing (public domain). This material is of varying levels of quality, subject to little comprehensive and detailed evaluation and of unknown appropiateness to school curriculum. These characteristics are summarized in Figure 2.

Although various attempts have been and are being made to describe, organize and evaluate this material, no standardized methods exist and this work is usually carried out by organizations with limited funding and personnel. (See Appendix V for information about individuals and organizations active in this area). Much of this work is in experimental or planning stages.

This situation of unorganized information regarding a potential educational resource (of unknown quality and appropriateness) which abounds in great quantities (and is growing rapidly) is compounded by the fact that *these materials are already in the schools* - notwithstanding the information problem and the lack of board/district/division/Ministry direction or guidance.

This situation poses a number of problems to various members and levels of the educational community. Ministries of education are being pressed for direction, prescription, guidance and funding and recognize the need to evaluate and determine the appropriateness for curriculum of these materials.

School boards, districts or divisions are faced increasingly with requests for purchases and guidance from consultants about materials suitable for various subjects, courses, and abililty levels.

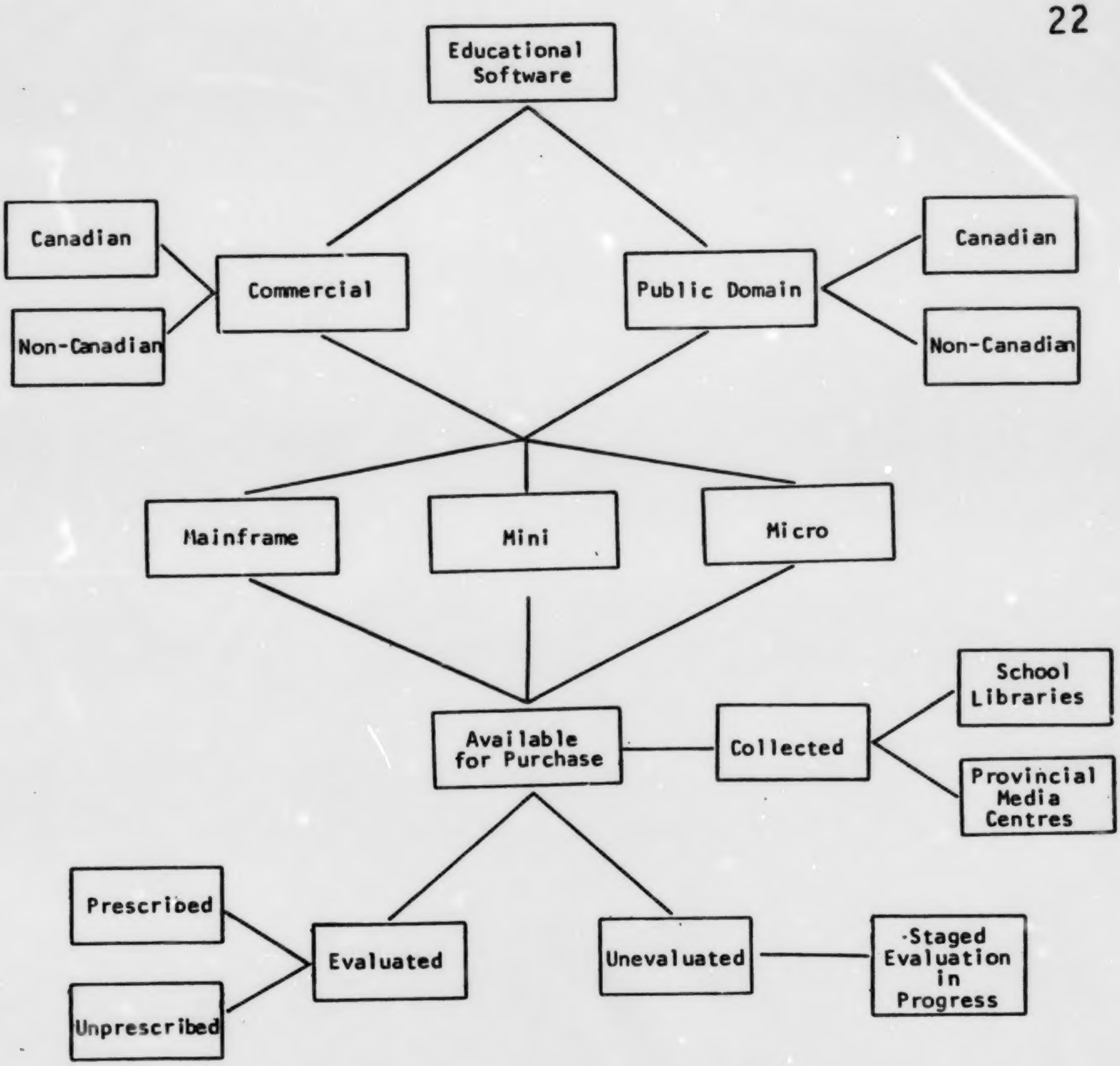
Teachers want to make intelligent selections of materials to complement their regular instructional program and need to integrate this material with other educational resources.

Resource and library personnel, although they may not currenty be affected, will ultimately be faced with the task of collecting, organizing, disseminating, and maintaining this material and determining how to integrate it with existing collections and methods. In addition, they will be called upon to suggest appropriate material or to provide information which will aid in the selection of appropriate material.

Students of varying grades and abilities will want and need to access software to supplement or replace regular instruction, or for drill and practice or enrichment of concepts already taught.

Solutions to all of the above problems will require ready access to accurate and useful information and descriptions of specific educational software programs. One of the major complaints of users of educational software is that reliable and thorough information on available programs is difficult and time-consuming to ascertain. Most descriptions can be found in a variety of vendor catalogues covering software, (See Appendix V for examples of software catalogues) but efforts are not coordinated and coverage is far from complete. Library treatment or organization of this medium is limited.

The medium of educational software gives rise to an unusual number of problems for libraries (or any individual or organization attempting to describe this material). Any method of description has the difficult task of trying to cope with differently defined levels of complexity, language dialects, program structures, memory, system and peripheral requirements, requirements for lesson and classroom management, specific education and technical documentation, limitations of transferability, the capability of the software to be used when different systems are linked together (interfaced) and, finally, complex methods of distribution.


Educational Software
Canadian
Non-Canadian
Commercial
Public Domain
Canadian
Non-Canadian
Mainframe
Mini
Micro
Available for Purchase
Collected
School Libraries
Provincial Media Centres
Prescribed
Unprescribed
Evaluated
Unevaluated
·Staged Evaluation in Progress

ADDITIONAL CONSIDERATIONS

1) Application - CAI, CMI, computer science, computer literacy, administration
2) Academic Level - elementary, secondary, post-secondary

Figure 2

POTENTIAL CHARACTERISTICS OF MATERIALS TO BE

INCLUDED IN A DATABASE OF EDUCATIONAL SOFTWARE INFORMATION

1.4 Problem Definition

Having defined our terms, and characterized the situation and the consequent problems posed to a variety of users, we may safely summarize the basic problem as the organization and dissemination of information about educational software. However, if the specific problems of various users are to be taken into account, we can see that a method or solution to the basic problem must:

1) allow for sharing - some measure of standardization is implicit
2) allow for individual difference in information requirements - flexibility required
3) provide efficient and quick accessibility - suggests automation
4) allow for interface with other educational resources (print and nonprint)
5) accommodate various organizational schemes for educational resources (local, provincial)
6) be workable now - suggests phased approach to any computerization or database of information.

The original problem definition can now be qualified and expanded upon to suggest: the organization and dissemination of information about educational software with a view to standardization, sharing, automation and interface with existing educational resources.

1.5 Disciplines Involved

In order to address the problem and its recognition of the need for standardization, sharing, automation, and interface it was necessary to investigate several distinct disciplines. Research revealed that each discipline harboured various issues with direct implications for our, as yet, undefined solution.

An examination of library standards revealed that procedures in school libraries indicate a marked lack of standardization - especially in the realm of non-print materials. The library profession is currently undergoing a strong push for standardization, but this action is still taking place.

Mechanisms for sharing information demanded that the current state of communications be examined. Predictably, education networking and library networking are all actively affected by the increasing potential for computer networking. Each of these forms of cooperation represents a subject for further study.

Automation was apparent in numerous forms which have implications for this research. These include library automation, online information retrieval and database management technology.

Finally, the area of organization of educational resources revealed various issues regarding the treatment of print and non-print materials.

Figure 3 represents a chart summary of these issues.

Attempting to assess the "state of the art" of the issues was further complicated by the following

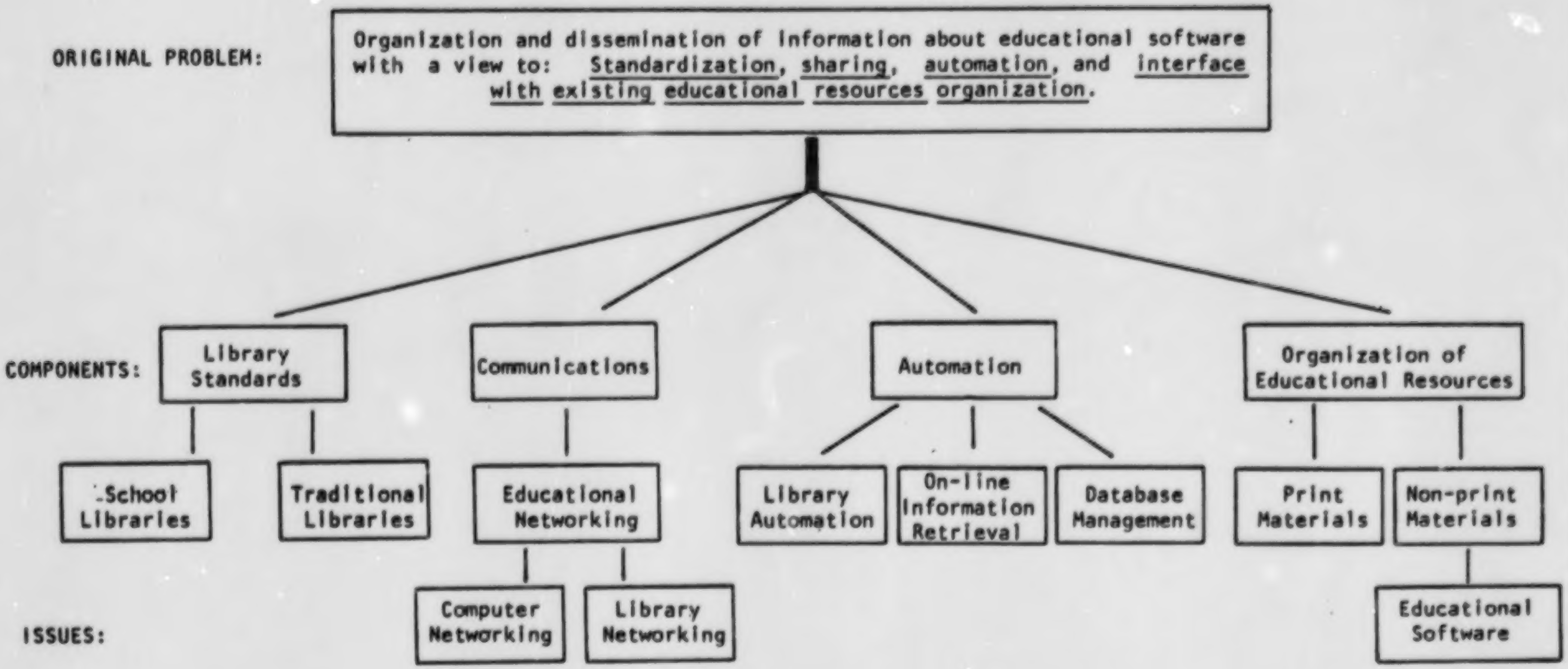

ORIGINAL PROBLEM:
Organization and dissemination of information about educational software with a view to: Standardization, sharing, automation, and interface with existing educational resources organization.
COMPONENTS:
Library Standards
Communications
Automation
Organization of Educational Resources
School Libraries
Traditional Libraries
Educational Networking
Library Automation
On-line Information Retrieval
Database Management
Print Materials
Non-print Materials
ISSUES:
Computer Networking
Library Networking
Educational Software

Figure 3

COMPLEXITY OF THE PROBLEM

interesting observations: all of these issues are intimately affected by computer technology in one form or another. The flux (rapid growth and change) of this technology makes "getting a fix" on these issues a frustrating task for the experts within the fields. The dynamics of this technology and itr concomitant effect on these disciplines has served to add to the already considerable frustration.

The foregoing discussion serves to demonstrate the complexities inherent in the problem.

1.6 Project Outline

As is often the case, definition of the problem is more than half the task of providing the solution. Having carefully defined the problem posed by educational software to educators, certain solutions began to present themselves. The balance of this report presents suggested solutions and rationales based on extensive research and field contacts and will be structured in the following manner:

a) A review of findings regarding the treatment of educational software, library methods, on-line databases and some comments about delivery systems;

b) Suggestions for a standardized description for educational software. This section will summarize important considerations and problematical issues in the development of this standard, present a detailed discussion of suggested components of such a standard, and give examples of display formats for a standard description;

c) A suggested plan of action for the establishment of an information sharing mechanism for educational software. The sequential plan will combine steps to be followed, recommendations regarding certain issues, and suggestions for further study. A tentative time and cost analysis of future work is also supplied;

d) A collection of information in the form of appendices. This information includes a contact log, glossary of terms, a subject index, examples of field formats, a list of clearinghouses for educational software and educational resources, a collection of materials about information retrieval packages suitable for database management, examples of evaluation methods appropriate for educational software, and finally, examples of present applications of the PRECIS indexing method.

2.0 Summary of Research

The major thrust of this project was to assess the information requirements of users of educational software, determine how these needs are currently met and to suggest, if appropriate, an improved method of meeting those needs. Implicit in the purpose of such research is the understanding that current information requirements regarding this educational medium are not being met in a satisfactory manner.

The following summarizes current treatment of this material by libraries and other information organizations, as well as systems which might provide access to this information.

2.1 Cataloguing

The term "catalogue" suggests two concepts; the library catalogue, which describes documents located in a library and the vendor catalogue which lists products available for purchase. Both serve as selection tools - the former acquaints the user with documents available in the library and with classification information which helps the user to determine the appropriateness of each item; the latter acquaints the potential purchaser with items available for purchase and attempts to provide sufficient information to allow intelligent selection of materials to be purchased.

Educators concerned with educational software require catalogues in both senses - as a library tool and a purchase tool. The latter represents the more pressing of the two needs since collections in school libraries of educational software are minimal and in most cases non-existent. However, as the numbers of these materials multiply, collections will evolve and the library or resource task of organizing, describing, and maintaining collections will present itself. School librarians have little information and few guidelines for cataloguing this material and integrating it with other school resource materials.

Although both types of catalogues share certain descriptive features, there are some information requirements which are unique to each. These unique data elements are determined by subtle differences in users, purpose, and form of each catalogue. A brief discussion of each type of catalogue may be helpful.

2.1.1 Library Cataloguing

The information provided by the library catalogue helps the user to determine:

- whether the collection contains a specific item;
- which works by a particular author are in the collection;
- which editions of a particular work are in the collection;
- what materials a collection has on a specific subject.

Generalization about library treatment of educational software may be drawn from the present state of organization of non-print materials within schools. Most collections are ordered under some system of accession numbers. In order to identify an item meeting a particular need, various classification and retrieval systems are used, all of which have advantages and limitations. The commonest method of search uses either a Dewey Decimal or similar classification system, or a subject index (usually Sears or Library of Congress headings) which may or may not be linked to an accession number.

In all too many cases, the system has fallen down over failure to provide full and comprehensive cataloguing cards. Information provided has tended to be very brief, indicating what medium the material is in, but rarely a satisfying descriptive comment.

Similar types of media are usually stored together, and frequently the classification system is also organized in the same way. This means that a user wishing to find material on a particular concept must consult several catalogues, card indexes, etc.

Cataloguing codes used in school libraries for non-print materials vary from one of a number of existing "official" methods (See Figure 4, Major Codes for Cataloguing Non-print Materials Used in School Libraries) to, especially in smaller schools, home-made methods which may be as simple as a list of titles.

The variation of treatment of library materials in schools is reflected in the consequent variety of services offered by library jobbers such as the National Book Centre (66 Northline Road, Toronto, Ontario) and Baker and Taylor Co. (an American firm) which distribute, catalogue, and process books or libraries. The act of processing usually means supplying one or more products such as: spine labels, plastic protective jackets, borrower's cards, and other appropriate labels and supplies. Many school libraries purchase exclusively from these jobbers, thereby eliminating original cataloguing and processing from the responsibility of the school librarian. Prices and details of these services are outlined in Figures 5 and 6.

Figure 6 especially illustrates the wide variety of procedures which may be followed by school libraries in their organization of educational resources. This variety is most notable in the area of classification and subject headings where one or more of several combinations is apparent.

For example, Canadian librarians may use one of two versions of the Dewey Decimal Classification system (of which there are 19 and 11 editions) or the Library of Congress classification scheme. With reference to subject headings, they may use Sears or Library of Congress subject headings, each of which is supplemented by an additional Canadian comparison or authority and which is also subject to periodic revision in order to accommodate changes in language and new disciplines in the classification of knowledge. When one considers that subject access in most libraries relies on these classification or subject heading systems, it is not surprising that many users express a desire for better subject access to library materials.

It should be noted, however, that with reference to cataloguing codes (which are distinct from classification and subject system) librarians have recognized a need for standardization and, insofar as print products are concerned (books), the second edition of the Anglo American Cataloguing Rules is now recognized as the accepted standard.

AACR2 is the first code to apply an international standard to both print and non-print materials. All of the relevant information about non-print materials can be presented in a uniform, predictable format. This has implications for any cataloguing activity which intends to accommodate various media types of educational resources. AACR2 rules for non-print materials were developed from the first edition of AACR2, the revised chapters 6, 12, and 14 of the first edition, and Canadian, American and British rules. AACR2 provides much more specific guidance in dealing with non-print formats than any other current code. Yet it permits flexibility in determining the extent of description based on individual needs.

In addition, AACR2 devotes an entire chapter (the ninth) to the medium entitled "machine-readable data files". This medium, by definition, includes such items as computer data files (social survey data, bibliographic files), textual files, and computer software (educational programs, computer models, commercially-produced software for minicomputers, locally-developed programs).

Because bibliographical control of software is still in the infant stage, it was difficult to find examples of actual application of the ninth chapter of AACR2. However, contact was made with the Curriculum Lab at the Faculty of Education, University of Alberta which has used AACR2 in the cataloguing of approximately 200 examples of educational software. Because the concept of an integrated collection (a collection which organizes all materials, regardless of media type, in the same way) is deemed an important one at the Lab, the use of the same standard cataloguing rules for software as other media is highly desirable. Librarians find the code easy to apply and see no reason to treat the material any differently from other library materials. Their only complaint echoed similar laments of their users - the inefficiency of present subject and classification schemes when providing subject access. (This problem is further discussed in Section 2.2 - Indexing).

Bibliographic standardization is the key to any type of cooperative resource information sharing venture. If school librarians and other educational learning materials centres hope to become involved in information networking (especially computer-based networking), they cannot continue to use local codes and manuals for cataloguing shared materials. AACR2 presents school media specialists with available cataloguing guidelines adequate to the task at hand - providing a good catalogue entry for all of the materials they collect and use.

If schools and other educational institutions wish to participate in library networks, they will have to conform to AACR2 standards. Relatively few schools currently participate in bibliographic networking supported by automated shared cataloguing such as that associated with UTLAS. However, as schools begin to respond to the pressures to join with other schools and libraries of other types in the interest of information sharing, they will be getting cataloguing records from these utilities (UTLAS). Schools will have to adopt the code (AACR2) if they are to receive the full benefit from network participation.

It is, therefore, proposed that any library cataloguing records created for educational software be based on the AACR2 code.

Figure 4

Major Codes for Cataloguing Non-print Materials Used in School Libraries

Tillin, Alma W. *Standards for Cataloguing Non-print Materials*. 4th ed. Washington, D.C.: AECT, 1976

Tillin, Alma W. *Standards for Cataloguing Non-print Materials*. 3rd ed. Information Science Committee, AECT,1972

Tillin, Alma W. *Standards for Cataloguing Non-print Materials*. 2nd ed. Cataloguing Committee, AECT, 1971.

National Education Association. *Standards for Cataloguing, Coding and Scheduling Educational Media*. Department of Audiovisual Instruction, NEA, 1968.

Welhs, Jean Riddle; Shirley Lewis; and Janet MacDonald. *Nonbook Materials: The Organization of Integrated Collections*. Ottawa: Canadian Library Association, American Library Association, 1973.

Welhs, *et al*. Preliminary edition, 1970.

Anglo-American Cataloguing Rules, North American Text. Chicago: American Library Association, 1967.

AACR2. Revised Chapter 6, 1974.

AACR2. Revised Chapter 12, 1975.

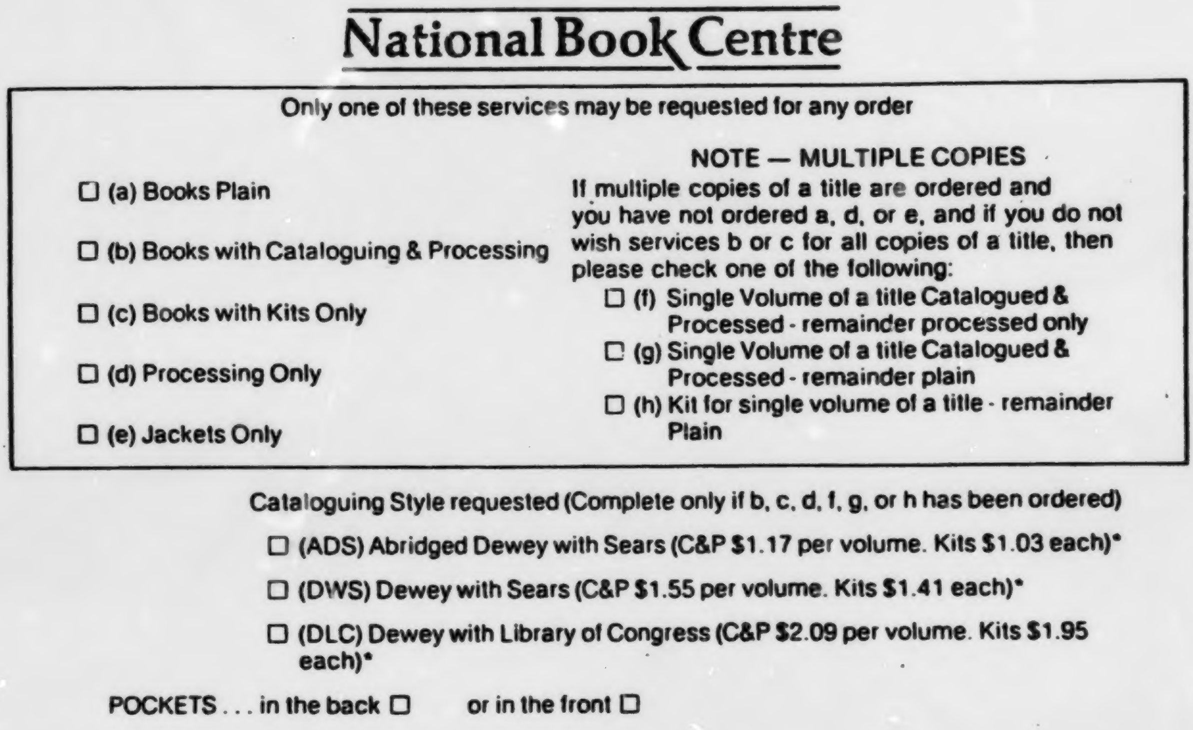
AACR2. Revised Chapter 14, 1976 (also found in LC Cataloguing Service Bulletin 115, Fall 1975.)

Figure 5

Cataloguing and Processing Costs of two Library Jobbers:

National Book Centre and

The Baker and Taylor Company



National Book Centre

Only one of these services may be requested for any order

☐ (a) Books Plain

☐ (b) Books with Cataloguing & Processing

☐ (c) Books with Kits Only

☐ (d) Processing Only

☐ (e) Jackets Only

NOTE — MULTIPLE COPIES

If multiple copies of a title are ordered and you have not ordered a, d, or e, and if you do not wish services b or c for all copies of a title, then please check one of the following:

- ☐ (f) Single Volume of a title Catalogued & Processed - remainder processed only
- ☐ (g) Single Volume of a title Catalogued & Processed - remainder plain
- ☐ (h) Kit for single volume of a title - remainder Plain

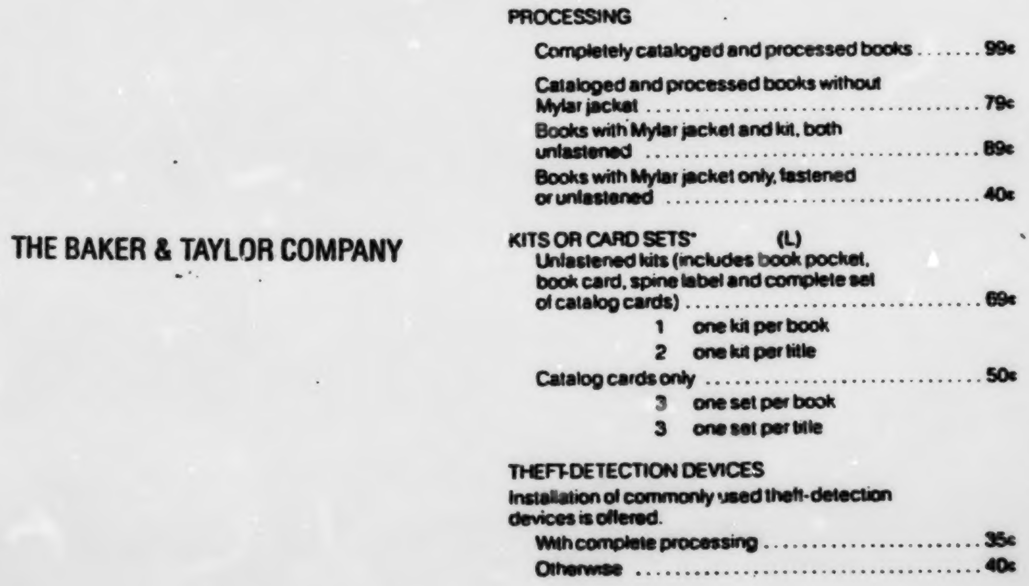
Cataloguing Style requested (Complete only if b, c, d, f, g, or h has been ordered)

☐ (ADS) Abridged Dewey with Sears (C&P $1.17 per volume. Kits $1.03 each)*

☐ (DWS) Dewey with Sears (C&P $1.55 per volume. Kits $1.41 each)*

☐ (DLC) Dewey with Library of Congress (C&P $2.09 per volume. Kits $1.95 each)*

POCKETS . . . in the back ☐ or in the front ☐



THE BAKER & TAYLOR COMPANY

PROCESSING

Completely cataloged and processed books	99¢
Cataloged and processed books without Mylar jacket	79¢
Books with Mylar jacket and kit, both unfastened	89¢
Books with Mylar jacket only, fastened or unfastened	40¢

KITS OR CARD SETS* (L)

Unfastened kits (includes book pocket, book card, spine label and complete set of catalog cards)	69¢
1 one kit per book	
2 one kit per title	
Catalog cards only	50¢
3 one set per book	
3 one set per title	

THEFT-DETECTION DEVICES

Installation of commonly used theft-detection devices is offered.

With complete processing	35¢
Otherwise	40¢

Figure 6

Services of National Book Centre including BABS (Book Acquisition and Bibliographic Services)

National Book Centre catalogues print material in the English and French languages. The cataloguing service is not available for the following kinds of material: books in languages other than English and French, newspapers, periodicals, music scores, Government documents, technical reports, vertical file material, maps, out-of-print or remainder titles, audio-visual materials, books that are not bought from National Book Centre, and some mass-market paperback titles. We undertake to catalogue all quality paperbacks, providing this service has been requested; however, we reserve the option to reject any mass-market paperback title that, in our opinion, should not be catalogued.

CATALOGUING SERVICES

The following combinations of subject headings and classification are at present available to all customers:

No. 1 Service

(A.D.S.) Abridged Dewey Decimal Classification and Sears Subject Headings.

No. 2 Service

(D.W.S.) Dewey Decimal Classification and Sears Subject Headings.

No. 3 Service

(D.L.C.) Dewey Decimal Classification and Library of Congress Subject Headings.

Classification is by the latest edition of the appropriate schedules that were available at the time the title was catalogued by National Book Centre. Subject headings will be based on the latest edition of the appropriate subject heading list. For Canadian materials, Sears Subject Headings are supplemented by the Canadian Companion, and Library of Congress Headings are supplemented by the Canadian Subject Headings from the National Library of Canada.

BABS® provides Professional Cataloguing and Processing Services which offer the flexibility and options required by most types of libraries.

The Cataloguing Services are based on the latest editions of classification schedules, subject heading lists, and cataloguing rules. In 1980, National Book Centre began using the 2nd edition of the Anglo-American Cataloguing Rules, the 19th edition of Dewey Decimal Classification, the 11th Abridged Edition of the Dewey Classification, and the latest editions of Sears and Library of Congress Subject Headings, supplemented by the Canadian Companion to Sears and the list of Canadian Subject Headings from the National Library of Canada.

The Cataloguing Services are tailored to the requirements of the customer and allow for optional treatment in such areas as biography, fiction, easy reading, cuttering (author letters), designation of juvenile materials, etc.

2.1.2 Vendor Catalogues

The vendor catalogue contains information about products available for purchase and is used by educators as a selection tool. There are numerous catalogues of educational software which are published by the vendor or by cataloguing agencies. Their usefulness is impaired by the following factors:

a) insufficient information;
b) questionable value judgements inherent in the subjective nature of each;
c) inadequate indexing systems (may be indexed by machine, application, "education", or very broad subject headings - "mathematics", "science") which inevitably require the reading of each and every description to determine material appropriate for grade level and subject;
d) lack of standard format for descriptions - between and within catalogues, making intelligent comparison exceedingly difficult;
f) profusion of different catalogues (supplied by publishers and producers often providing different descriptions of the same materials).

Examples of these catalogues appear in Appendix IV.

There is a definite need for a catalogue of available educational software which:

a) lists public domain and commercially produced

software (although this might best be accomplished by separate catalogues);
b) provides thorough, standard descriptions;
c) can be used by educators to indicate what educational software is currently available;
d) can be updated yearly to reflect new materials;
e) provides suitable indexing by subject so that users can easily locate appropriate descriptions within the catalogues;
f) provides indexing which allows users to locate "known" materials easily;
g) provides sufficient information to allow the user to determine whether or not the material is suitable (i.e. hardware specification, cost, availability, instructional methods, topics addressed, etc.);
h) can be produced economically and efficiently.

In summary, librarians and educators in the field have indicated a need for two kinds of cataloguing information and access. See Figure 7.

Any proposed methods for improving information dissemination regarding educational software will have to take these needs into account.

Figure 7

CATALOGUING NEEDS

	FUNCTION	INDEXED BY	DELIVERY
A SELECTION TOOL FOR PURCHASERS	- provide a complete description - indicate characteristics unique to the package and medium - interface with similar tools for other educational resources - provide guidance for education attempting to determine appropriate existing materials	- machine - subject - topic within subject - keywords - instructional strategy - grade level - application	- print catalogue - on-line database (like ERIC)
A LIBRARY TOOL	- provide original cataloguing format - indicate contents of a collection - interface with other learning resources in the collection - let teachers and students know what exists in collections to which they have access	- title - author - traditional subject classification (Sears or Library of Congress)	- 3 x 5 cards - COM - on-line database (like UTLAS)

Any proposed method for improving information dissemination regarding educational software will have to take these needs into account.

2.2 Indexing

2.2.1 Library Indexing

An indexing system attempts to link the user with those materials in a collection which are appropriate for his particular purpose. Materials in libraries are most often "indexed" by title, author, and a subject heading derived from one of the traditional subject heading schemes (Sears or Library of Congress). When a user is trying to locate a specific record, as long as the exact title or author are known, then the record can easily be found, referenced to a call number and subsequently retrieved from the shelf.

However, searching for materials on a certain subject is often a frustrating assignment. Numerous problems arise for the user as a result of indexing the contents of a growing collection by a traditional list of subject headings:

a) subject terms become outdated and fail to keep pace with contemporary educational jargon
b) terms may be too specific
c) terms may not be specific enough
d) "see" and "see also" references, which attempt to link the user's entry vocabulary or term to the "correct" term - or the term used by the indexer, need to be constantly updated.

2.2.2 Print Catalogue Indexing

Although the card catalogue at the local library presents problems regarding subject access, the subject indexing offered by most vendors' print catalogues is less than adequate. Educational software is often simply listed under "education" or may be broken down to include "Math and Science" or "Language Arts". Some education specific catalogues may derive as many as 15 - 20 subject headings, but the user is still often required to read **all** descriptions in the catalogue in order to find materials which cater to subject, grade level, and hardware specifications.

2.2.3 ERIC

Some organizations concerned with indexing large numbers of educational materials such as ERIC and NICEM solve the problem posed by subject access via broad traditional subject headings by establishing their own list of subject headings or descriptors. This new vocabulary of keywords is developed with their specific discipline in mind and, as such, provides an excellent list of specific terms appropriate in the indexing of educational documents.

The controlled vocabulary for ERIC is found in the ERIC Thesaurus, an excellent tool for indexers and ERIC users, which provides an alphabetic listing of all terms. Each entry links descriptors with more specific or broader terms, indicates how many times that descriptor has been used to index a document at the time of publication of the Thesaurus, and most include scope or explanatory notes which give a definition of the descriptor. The Thesaurus also lists old descriptors with their new, more appropriate descriptors and provides several useful searching tools such as a rotated descriptor display.

The ERIC vocabulary represents a successful attempt to establish and maintain a controlled vocabulary of educational terms. However, the ERIC system was developed for machine retrieval. Each document is linked to a number of ERIC descriptors and by using combinations of these descriptors, appropriate documents can be retrieved by computer in a very efficient manner whereas the manual application of these descriptors proves quite awkward. For example, a software package might hypothetically be assigned descriptors designating subject: MATHEMATICS, ADDITION; grade level: ELEMENTARY; and, since we are being hypothetical, hardware: APPLE II. Using these descriptions in combination in an automated information retrieval system might generate a set of document references which could easily be consulted. However, using only one of the descriptors (as one must when consulting a print index) would, in each case, access a large number of descriptions, all of which would need to be read in order to eliminate the inappropriate references (i.e. MATHEMATICS, ELEMENTARY, PET or MATHEMATICS, ADDITION, SECONDARY, APPLE II).

When and if on-line catalogues become the rule, rather than the outstanding exception (and that day will come), a keyword system which links descriptors together, such as the ERIC system, will be most useful to Canadian educators. However, in the interim, the print catalogue is the most accessible tool available and thus, any contemplated indexing method must accomodate the one dimensional nature of the indexing structure of this instrument.

2.2.4 PRECIS

There is a system, currently in use in Canada, which can approximate the level of specificity of a keyword system, offer an alphabetic subject index which displays simultaneously all keywords or concepts used to index a record, and which has been adapted to accommodate on-line searching. This system is called PRECIS (Preserved Content Indexing System).

PRECIS was developed to produce, by computer, a printed index for manual retrieval, but its design accommodates the potential for machine retrieval. Pre-coordination of terms (or pre-combination of distinct concepts) is achieved by stringing together natural language terms according to strict rules of systems laid down in the PRECIS string.

PRECIS preserves pre-coordination and facilitates manual searching - a necessity for small Canadian education libraries. But, should technology develop so that on-line retrieval is available and economically viable to all users, PRECIS has already been developed to serve in the new situation. (The National Film Board's FORMAT, a bilingual national computerized audiovisual information system, uses PRECIS to provide subject access to its film file. This information is available to users in computer-generated hard copy catalogues, computer-output microform (COM) and on-line. PRECIS has been found to be effective in the context of all three forms of output).

It should be pointed out that PRECIS is more than an indexing language; it is a machine-produced alphabetical indexing system, based on syntax derived from a study of natural language. Therefore, it includes the manipulation programs as well as the instructions for indexing. Considered as a language, PRECIS differs from other indexing languages insofar as it consists essentially of a set of working procedures, not a prescribed list of term or phrases. This means that an appropriate list of terms, linked to traditional subject lists but infinitly more flexible, could be generated.

One of the potential products of PRECIS is a thesaurus. Because PRECIS is a flexible natural language system, the thesaurus can be developed to reflect Canadian usage.

The Library of Congress, Sears, and Dewey Decimal systems were developed for manual production and manual search methods. Pre-coordination of terms aids enormously in manual retrieval. However, broadness of the terms produces many irrelevant citations during machine retrieval.

The ERIC system was developed for machine retrieval. Unbound terms used post-coordinately make it ideal for machine retrieval but most awkward for manual use.

PRECIS seems most appropriate for present needs of users of educational software in that it:

a) caters to both manual and machine retrieval systems;
b) can be used to reflect Canadian terminology;
c) has already been utilized in a bilingual application;
d) the PRECIS software is readily available in a Canadian system (UTLAS);
e) has proven useful in the indexing of non-print materials generally and educational software specifically.

Appendix IX is devoted exclusively to PRECIS and provides information about four current users of the system (3 Canadian, 1 American; 3 non-print materials, 1 print) and more specific information about how PRECIS works.

2.3 Delivery Systems

Consideration of a vehicle for delivery of the information services required by users of educational software was necessary during this research, notwithstanding the contract stipulation that consideration of a delivery system was outside the scope of the project.

2.3.1 Centralized vs. Decentralized Systems

Before proceeding to an outline of delivery system options available, it may be useful to summarize the advantages and disadvantage of a centralized versus decentralized system.

A centralized system offers the following advantages:

a) avoids duplication of cost and effort;
b) it is cheaper for provinces to share in creation of one system than for each province to sponsor this work on its own;
c) central cataloguing records mean that material need only be catalogued once and then made available for sharing;
d) in spite of some provincial uniqueness, most educational software is relevant to all provinces and therefore, information about that software is of interest to all participants in the system;
e) allows 12 regions to benefit simultaneously from the expertise and services of a coordinated effort which includes the delivery system and a coordinating agency;
f) updating one database is easier and cheaper than updating numerous databases;
g) producers are more likely to cooperate with a coordinated, authoritative venture than with numerous, small, disjointed ones;
h) the problem of obtaining evaluations may be more easily solved through cooperation and sharing of results than proceeding independently;
i) some provinces which might not otherwise have the resources to establish their own system would especially benefit from a cooperative effort.

A decentralized system offers these advantages:

a) the system can cater to specific provincial needs;
b) the province maintains complete control of information and procedures;
c) there is no need to alter provincial formats and procedure to accommodate those of other provinces;
d) a delivery system could be selected that is compatible with an existing provincial hardware network;
e) experts in the use and structure of the system would be available locally rather than nationally.

A compromise which invites the advantages of both systems is a distributed network which coordinates input from and products for provinces in such a way that cost and effort is shared while unique provincial requirements are also met.

However, a distributed network has some problems of its own which must be addressed before it represents a viable alternative. These issues include:

a) At present, because of the provincial educational structure in Canada, there is no authority or organization with the mandate and resources to coordinate such an effort.
b) Subscription to a cooperative network brings extra responsibilities to participants in terms of data submission (a standardized format must be adhered to).
c) Well-defined policies/procedures would need to be established to protect the integrity of a central database.
d) The more extensive and sophisticated the design of the distributed system, the greater the requirements for a central system or coordinating agency to control the network.
e) Some provinces are better able to contribute resources to such a network than others.

2.3.2 MARC Format

The first implication for the use of any delivery system which aspires to exchange cataloguing data via computer will be the use of MARC format in record storage. The original MARC format document established conventions for encoding data for monographs in a machine-readable form. Though it was understood that early applications were going to relate to the production of catalogue cards, the MARC format looked ahead to an increasing emphasis on data retrieval applications.

The MARC system works in the following manner: records are created in standard form, and each element of the record (eg. title of items) is given a code or tag specific to that class of elements. The records are punched on to a computer input tape as a string of tagged elements, through a conventional keyboard machine which immediately types them back for checking. After checking, the records are stored on the computer input tape until required.

The original purpose of the MARC format is still a cogent and necessary one - that of allowing for a great variety of individual library needs for products, practices, and policies via a standardizing communications format. Both catalogue card production and on-line retrieval necessitate the same level of specificity, though particular tags, indicators, and subfield codes may vary.

Benefits that accrue to computing operations as a result of the MARC format include the use of a communications format which facilitates communications, card/COM production, and on-line information retrieval.

As a communications format, it is as coherent as any other structure for carrying bibliographic data. Because the format allows for a very specific level of detail in description, computing operations can supply a variety of products to fill a variety of needs.

In cataloguing activity, the benefits from the use of the MARC format as part of an on-line cataloguing system permit the machine-production of catalogue cards at a major savings over manual production. Second, access to a shared cataloguing database permits the use of "clerical" cataloguers at a considerable cost saving per item when compared to "original" cataloguing. Third, depending upon the information available in the cataloguing record, the time required for decision making during the cataloguing process can be decreased significantly.

The benefits of the use of the MARC format continue to be in the ease with which bibliographic information can be shared and the concomitant beneficial impact on cost control. In addition, the MARC format supports a host of other standards and codes and the benefit from these relationships has been consistency in and fostering of standards development.

The MARC format for machine-readable data files (MRDF) is one of a series of communications formats developed by the Library of Congress. Since the Library of Congress does not have any plans to catalogue MRDF in the near future, this document is being issued as a preliminary edition to allow the library and information communities to test the format. It is hoped that as more experience is gained in the input of bibliographic records for MRDF, additional guidelines or instructions can be added to facilitate understanding and application of this format.

The format structure has been designed to accommodate machine-readable records describing all kinds of materials and designed for a variety of uses.

The Library, for example, has developed formats for books, serials, maps, films, manuscripts, music, sound recordings, and authority information. Formats for technical reports and analytics are being defined. This format for bibliographic records describing machine-readable data files has benefitted from this earlier work as well as from the ongoing analysis of the problem areas in the MARC formats.

The MRDF format has been designed to accommodate the data elements specified in the second edition of the Anglo-American Cataloguing Rules (AACR2), but the data elements included in the format have not been limited to those described in AACR2. Also, the explicit identification (or content designation) of these elements has been designed to accommodate a variety of products, eg., a data inventory, a data abstract, or a union catalogue, in addition to a catalogue record or use in a library catalogue.

It should be noted that the requirements for exchange of cataloguing data are not always compatible with the requirements for information retrieval. The approach taken in the development of the MRDF format was to include as many of the elements needed to describe the characterstics of the different types of machine-readable files and to exclude elements related to an individual agency's handling of the file. Elements like contact personnel and addresses or details of computer operations to run the file were not included at this time for that reason (It should be noted that flexibility of the MARC format accommodates this information in the form of technical or local notes). It is hoped that with experience in using the MRDF format to describe different kinds of files, decisions can be made in the future concerning such elements.

2.3.3 Computers and Library Procedures

The last five years have seen traditional cataloguing revolutionized by the use of the computer as a delivery system. Change has taken place mainly through library networks of one sort or another. Examples of these networks include UTLAS in Canada and OCLC in the United States (refer to Glossary for discussion of each).

There are basically three forms of output from these networks. The form most popular with school libraries is still the 5" x 3" catalogue card. This use of the computer to produce something old (albeit in a new way) represents acknowledgement of the fundamental conservative nature of libraries. The second type of output is Computer Output Microfilm. This form of catalogue has taken the place of the computer produced book form catalogue (bound computer) print out which was popular for a while. It seems probable, because COM is so much cheaper to produce than any other form of output, that its use will speed up over the next few years, and more and more libraries will be going over from cards to COM. For a thorough discussion of the benefits of COM and the inadequacies of the card catalogue refer to items 2.2 and 3.0 of _A Computerized Learning Support System for Ontario_ in Appendix IV.

There is little doubt that the third form of output will ultimately replace the former two. This is a catalogue whch is consulted on-line through a terminal. At the moment, economic restraints will necessarily delay the use of this method.

Two additional capabilities provided by the application of computers to cataloguing bear mentioning.

The first of these is an authority file managed by the computer system. This means that any heading which is input will be checked against this authority file and will not be allowed to join the database unless it conforms to standards that have been agreed upon by the network. The second development will be a facility for the computer to automatically change headings throughout the database. These elements will allow new concepts in cataloguing to be universally implemented and for errors and inconsistencies to be corrected at a modest cost.

2.3.4 Options

There are essentially two directions one might follow in selecting a delivery system suitable for the task of creating a database of educational software and providing certain products, notably library records and a print catalogue.

a) Purchase a database management system and have it customized to provide the service required. Information about various systems appropriate for this purpose appears in Appendix VII. In the opinion of the research team, this approach is likely to be the more expensive of the two options.

b) Approach vendors of commercial database mangement services (on-line databases) and determine the extent to which information requirements of the users must be compromised in order to accommodate file structure of the vendor. In the opinion of the research team, there exists a ready, working Canadian system in the combined use of UTLAS and FORMAT (National Film Board).

Both of these options assume the establishment of an on-line database. During our field studies, it became obvious that the understanding demonstrated by educators of the concept of a database varied. In order that this concept might be more completely understood, the following background information is useful.

2.3.5 On-line Databases

DEFINITION: On-line databases - computer-readable collections of data - are available for interactive access by users from remote computer terminals. These databases contain numeric, textual, or combinations of data areas, that can be used to meet both general and specific information needs.

BACKGROUND: A user sits at a computer terminal in the library, office, laboratory, or home, and dials a local telephone number (modem) with a computer in some other location. Using a special password, the user gains access to this "host" computer and requests access to the particular system and database of interest. The interaction language of that system, which is designed for use by persons without any computer programming background, permits them to retrieve and display specified information and, in some cases, to do statistical manipulation and other types of processing.

Since the mid-1960's, several streams of technologies and capabilities have come together to support the development and use of on-line database services. These technologies include the following:

1) Collections of numeric data and/or textual information (databases) that are processed by publishers and other organizations in computer-readable form for electronic publishing of printed materials.
2) Powerful timesharing computers that permit a very large number of users to carry on simultaneous interactions with systems through terminals that may be located far from the central computer and its store of data.
3) Interactive computer programs (software) that are

increasingly efficient, powerful, and user-oriented.

4) Rapid-access storage devices that have contributed to increase in capacity and reliability and, at the same time, decline in per-character data storage costs.
5) Computer terminals that can transmit and receive at various speeds - including 30 characters per second (300 baud) and 120 characters per second (1,200 baud) - and are more compact, portable, and less expensive than ever before.
6) Telecommunication networks that provide local access numbers in cities throughout the world for dialing into a remote computer at far less that the cost of dialing long distance.

During the period in which on-line database services have been developing, there has been an increased recognition of the role that information can play in meeting the needs of professionals in corporations, educational institutions, public agencies, and other types of research and service organizations. Although on-line databases have only rarely been subjected to cost-benefit analyses that demonstrate specific savings of time and dollars, user reports leave no doubt that they represent a valuable resource. The use of such databases can help to eliminate duplicative unnecessary research and development, introduce and promote the transfer of new ideas, services, and technologies, identify baseline data to help support the development of long range plans, simulate and forecast laboratory and economic situations, and identify or provide background and support data in a broad range of problem-solving situations.

PRODUCERS: Databases are developed by a group of suppliers referred to as "producers". In some cases, particularly for reference databases, producers are primarily publishers of printed index and abstract journals. These organizations - both the public and private sectors - acquire, screen, select, index, and sometimes abstract or summarize the primary literature. To produce their printed publications, these organizations have adopted automated systems for phototypesetting and thereby generate a magnetic tape that can be used further for computerized processing, particularly in storage and retrieval systems.

ON-LINE SERVICES: There are several kinds of organizations that provide on-line access to databases. The largest group of these organizations are timesharing firms, which provide access primarily to numeric databases. These timesharing firms are also known as "network information services" and as "remote computing services." They provide a number of services, including the use of their computers for the general data processing needs of an organization, consulting and development work in systems, and program development. The provision of database services has been an outgrowth of this tradition. The other on-line services are generally embedded in organizations that have a committment to various other information or data processing activities, although a few are organizations completely devoted to the provision of on-line database services.

ACCESS: Pricing policies for access to and use of the on-line database services are extremely complex. There are a number of components to the prices and they are combined in many different ways. In addition, prices are subject to change with fairly short notice. All of these factors make it extremely difficult to treat the topic in a standard manner. However, there are some general points that can be made about pricing.

In at least 30 percent of cases, there is an indication that some type of subscription is required for gaining access to the database. These subscriptions range from a few hundred dollars per year to several thousand dollars. In some cases, the user had several options, each a combination of a subscription price and associated usage charges.

Input Charges

Connect Time: An hourly rate, ranging from $1.00 to $21.00, that is charged for the period during which the user is connected to the system. (This figure may or may not include telecommunications charges).

Computer Resource Units: A rate for actual use of the system that combines charges for use of the central processing unit (CPU), the amount of input/output (I/O) required to read and write disks and interact with the user's terminal and, sometimes, charges for the user's workspace in the computer memory. The charges for these units (sometimes called CPUs) range from $.01 to $1.25 per unit. However, they cannot be compared across the on-line services because the formulas that are used to calculate charges vary from service to service.

Disk Storage: Additional costs are incurred if a user elects to store a selected amount of data from a database, perhaps along with the user's own data, in a "private" file.

Searching Charges

In most other cases, costs for database services are based on an hourly connect-time rate, plus telecommunications costs for network access, if applicable. The hourly connect-time rates that are cited in the supplier's literature may include a royalty, or a royalty may be cited separately. The range of connect-time rates (including applicable royalites) is from about $25 to $300 per hour. The average is approximately $65 per hour.

For bibilographic and some referral databases, there is an additional charge for off-line printing, which is generally based on the number of citations or pages. The range of charges for off-line printing is from $.05 to $5.00 per citation, although for a few databases they may be considerably higher. The average is about $.15. There may also be charges for on-line printing (ie. displaying retrieved information directly at the terminal). These fees range from $.50 to $50.00 per item. Both on-line and off-line printing charges may vary depending on the amount of information that is printed.

When one considers the complexities involved in database creation and maintenance as outlined above, it becomes clear that school systems do not have the resources or expertise to manage this kind of operation. Therefore, it is recommended that original construction of a database and delivery system be avoided if an existing delivery system with the expertise required can be found.

2.3.6 History of a Non-print Database

Now that the concept of an on-line database has been outlined, it may be useful to summarize the origin and development of such a database dedicated to the description of non-print materials. This summary should indicate the planning and coordination required for a task of such scope.

It is important to note that the database described (NICEM) is not suggested as a potential vehicle for information about educational software (the stipulation that any such database must be resident in Canada effectively eliminates NICEM). Rather, it represents a precedent which cannot be ignored. This summary draws extensively from an article by Slusser which appears in September 1980 Database entitled "Nicem, the Non-print Database".

NICEM (National Information Centre for Educational Media) began at University of Southern California in 1959 when a computer was used to produce a film catalogue for the Cinema Department File Distribution Section.

This initial effort generated so much interest among members of the Audiovisual Association of Southern California that they encouraged and assisted U.S.C. personnel in the development of a pilot project for the purpose of studying the feasibility of large scale automated cataloguing and a grant was sought from U.S.O.E. (United States Office of Education).

The potential value of the database as a source of information was acknowledged when the project formally became an official purpose of the new organization in addition to automated cataloguing work.

When the first indexes were published, they covered only the 12,000 items in films and filmstrips. To expand future indexes beyond this level, NICEM invited producers/distributors to submit information on new releases, plus revise or update information about existing software where appropriate. In addition, NICEM made an agreement with the Library of Congress (1966) that information on new media releases sent to L.C. could be used jointly. L.C. would use the information to produce catalogue cards and NICEM would use it to make new entries in the database.

Media software is a complex and elusive bibliographical area. Attempts to develop control mechanisms have met with only partial success due to high development costs, difficulties in securing consistent flows of up-to-date information and problems in the media profession. The indexes produced by NICEM are now among the most authoritative sources of bibliographical information currently existing and with the assistance of media producers/distributors plus the cooperation of the Library of Congress, they are being expanded and improved.

Until Lockheed Information Systems arranged to include NICEM in its commerical online Dialog service, the only access to its data was through subscription to the index service or patronage of a library subscribing to the indexes. Anyone needing information about media software either had to make a search through eight separate indexes to locate desirable items or use alternative sources of information which were less comprehensive in scope. Now, with the inclusion of NICEM in Dialog services, its .5 million items are accessible.

The NICEM database presently includes: Films, Filmstrips, 8mm Film Cartridges, Transparencies, Audio

Tapes, Video Tapes, Records and Slides. Their current guides for formatting entries are: The Anglo-American Cataloguing Code and AETC's (Association for Education Communications and Technology) Standards for Cataloguing Non-Print Media.

2.3.7 FORMAT/UTLAS

Canada has the makings of a database similar to the NICEM concept. This potential exists in a delivery system which comprises a joint effort of UTLAS and a program called FORMAT (Canadian Audio-Visual Products Information System) which has been developed by the National Film Board. This delivery system has the potential to offer the following to Canadian users of educational software:

a) A Canadian system which provides for both English and French language users.
b) A system which caters to non-print media.
c) Cataloguing experience and service.
d) Print catalogue production.
e) On-line cataloguing records.
f) Production of library products.
g) Expertise in the use of AACR2 and MARC format.
h) On-line information retrieval which is user-friendly.
i) Consultation and support services.
j) A cross-Canada hardware network (through UTLAS and NFB offices).
k) Access to PRECIS software.
l) Interface with information regarding educational resources in various media forms.

Further information about FORMAT/UTLAS is available in Appendix IX. It is the opinion of the research team that no other delivery systems exist which offer all of the above combinations of services and that negotiations should therefore begin to determine the cost and implications of using such a system.

2.3.8 Database Design

No matter what delivery system is selected, the following considerations should enter into any decision regarding the development of a database:

1) Building a database is a major step and expense for those organizations not currently utilizing automated information retrieval.

2) An assessment of needs and an analysis of resources is important.

3) Content and format of the database must not be considered independently.

4) Material for inclusion should be difficult to access manually - because the collection is large and/or because of a need to combine various data elements in a search statement, something that is difficult, if not impossible to do, in a manual search.

5) Individual records should not require changing of data. Additions and deletions of records are acceptable, but the alteration of entered records is costly.

6) The suitable size of a database is more accurately determined by usability than number of records. (A record is defined as a related body of data, eg. referring to one source which has a unique accession number). Records which are traditionally bibliographic in nature can be effectively handled manually, while complicated data records which require multiple access points and complex search logic are better candidates for an automated database. Questions such as "how usable is this information" or "is it necessary to make this

information more accessible" rather than "how many records exist" are more useful in determining the justification for an automated system. However, it has been suggested that 5,000 records is a reasonable minimum size for a bibliographic data base.

If, after these initial considerations, a database seems appropriate, the following first steps are suggested:

1) Determine what materials should be included in the database.
2) Decide what the records will contain, i.e. what data elements or fields the records will include.
3) Determine as many access points or subject access routes as possible. In a bibliographic database these would include the more traditional data elements such as title, author, and publication date, but consideration should also be given to such elements as vocabulary terms, abstracts, etc.
4) Determine what search parameters must be satisfied.
5) Create a file design sheet. List the various data elements for each record and the treatment required for each (i.e. whether searchable only or searchable and printable).
6) Design a worksheet for the data process.
7) Document all requirements, eg. cost, update frequency, search needs.

Section 3.0 of this report represents completion of the first two tasks mentioned above. Section 4.0 outlines an implementation plan which includes the remaining tasks.

3.0 STANDARD DESCRIPTION

3.1 Introduction

The first step in any attempt at sharing information to be gathered from numerous sources is to establish a standard for all descriptions. Various benefits may be derived from this uniform structure for information provision:

a) Users of the descriptions who become familiar with the structure will know what kind of information to expect and where to best locate it within the whole record structure.
b) A standard physical and intellectual structure lends itself more easily to the task of comparing different records.
c) It is much easier to integrate records from various sources if they follow the same structure. This integration or coordination of information from different sources is paramount in the operation of a shared database.
d) A standard format is more likely to encourage submission of information from publishers and authors than a general "call for information".
e) Once producers of educational software are familiar with a widely used common format, they may tailor their product literature and development to standards implied by the format.
f) Consideration of a delivery system cannot take place until an indication of record structure and size is available. A standard description makes possible an assessment of this structure and size.

Once the guidelines for a standard description are set a number of other steps can be taken in the process of information gathering. Input forms which allow for submission of information about educational software can be designed. These forms, accompanied by guidelines or instructions, can be circulated to individuals or groups who have information to share. When these forms are collected and processed, a database of information can begin to emerge.

It is important to note that these initial forms serve the purpose of gathering raw data. This data can then be manipulated, processed and restructured to suit the needs and requirements of users and the selected delivery system. Not all the information gathered may appear in all products generated by the database. However, it is important that the initial gathering of data be as comprehensive, organized and thorough as possible. Deletion or omission of data is a much simpler matter than additional solicitation of data subsequently found to be important.

The suggested description has been broken down into data elements which are arranged in successive "fields" of information. A "field" is a record division usually reserved for individual data elements such as "author", "producer", or "title". The following considerations regarding field selection were kept in mind during the process of field definition:

a) More, rather than fewer fields, will increase the on-line searchability of records.
b) Separately defined fields have no bearing on the appearance of the printed or displayed record.
c) Record fields and display format should not be confused. The former represent data elements entered into a system for each and every record and which may or may not be used as access points to the latter (display format) which can be made available in a variety of forms depending on the user and the vehicle of display. For instance, a very abbreviated format may be more appropriate for cards and COM than a full format (all data elements recorded).

d) A field should be assigned to each unique data element that will appear at some time in the database, regardless of the frequency of that appearance. All data elements will not necessarily appear in all records. Allowance should be made for even the most infrequent of data elements which will enhance searching for certain records.

In addition, fields were selected which were deemed appropriate to the following users:

a) educators who require a comprehensive description in order to compare and select software;
b) librarians who require cataloguing records in order to process software which becomes part of the library collection;
c) students who wish to determine software appropriate to their needs;
d) information specialists who wish to organize and disseminate information about educational software in the most useful and efficient manner possible;
e) Ministry of Education personnel requiring information on which to base curriculum and policy decisions;
f) producers who may find descriptions useful for comparison and development needs.

3.2 Problems

Section 3.3 (Suggested Fields) of this report presents 26 recommended fields of information deemed useful in a standard description of an educational software package. A concentrated effort has been made to anticipate all data elements likely to be useful to educators.

During the process of defining the components of a standard description, the Research Team was able to draw from:

a) suggestions from educators in the field;
b) numerous existing descriptive formats for educational resources generally and software specifically; and
c) the Research Team's own familiarity and experience with the medium.

It is important to note that discussion and consideration of potential fields could not take place without a simultaneous consideration of certain practical problems posed by the eventual implementation of such a description. That is to say, the instrument (the standard description) could not be developed without considering the process by which it might be applied - even though this process might conceptually belong to the realm of the delivery system (not considered a term of reference or deliverable for the report).

Consequently, certain assumptions and decisions had to be made during the course of field definition in order that the instrument of a standard description might be developed. These assumptions/decisions will appear as recommendations in section 4.0 of the report (Implementation Plan).

However, it is appropriate that a thorough discussion of the rationale for some of these recommendations appear at this point in the report, in order to avoid questions which would otherwise certainly surface during a reading of the section on Suggested Fields.

The following three recommendations or assumptions were made by the Research Team during the field definition process:

1) A database (manual or automated) of information concerning educational software needs to be developed.
2) Although this database will contain various categories of information including evaluative information, the highest priority should be that of a Descriptive File of software. The fields in this File should be of a purely descriptive nature and should not contain evaluative comments. Once the procedures for establishing a Descriptive File exist, work can begin on a parallel Evaluative File.
3) Completion of fields for each record in this database should be, wherever possible, a cooperative effort which draws from the expertise of different specialists and which is coordinated by a central authority.

A detailed discussion of 2) and 3) above follows in Section 3.2.1 (Evaluation) and 3.2.2 (Field Responsibility).

Finally, the reader must bear in mind (as did the Research Team during the field definition process) that the standard description and the fields of which it is comprised may be affected or subsequently altered by two influences, the impact of which can not currently be estimated. These are:

a) regional or provincial differences; and
b) the delivery system

These are discussed in greater detail in Section 3.2.3 (Regional Differences) and 3.2.4 (Delivery System).

3.2.1 Evaluation

Fields of a Descriptive File should be of a purely descriptive nature and should not contain evaluative comments.

The initial question regarding what information should be included in a database of computerized education resources focussed on whether or not the database should include only materials that have been evaluated or whether it should include a description of all available materials, good or bad, evaluated or awaiting evaluation.

There are a number of problems if only materials which have been evaluated are listed:

a) There is at this time no standard evaluation instrument or guideline in use across Canada, although some provinces are moving to adopt a standard.
b) Each province has its own procedure for evaluating materials to be approved for the curricula.
c) Each province has its own curricula.
d) At the present time, there are not enough trained evaluators in the field to evaluate enough programs to warrant a database.
e) Evaluations that are available have followed no standard evaluation procedure.
f) Discussions among the provinces regarding a solution to the above problems are just beginning.

On the other hand, there are a number of factors which suggest advantages to educators in the establishment of a descriptive database of available materials:

a) Teachers independently are collecting and listing educational software, although according to no prescribed standards.

b) There is duplication of effort with no possibility of sharing information or responsibililty without an established standard descriptive format.

c) Teachers are making the decisions regarding which software will be purchased and they want to know what materials are available.

d) New software is appearing daily and educators are not prepared to wait for the results of the evaluations.

e) The first step in choosing materials to be evaluated is the organization of information regarding what is available.

It is therefore recommended that a database of computerized materials initially include only fields which simply describe what is available. It is further recommended that any decisions regarding evaluative comments be deferred until agreement exists amongst the provinces as to which evaluation instrument is to be used and who will be responsible for evaluating what materials. This agreement must be reached through national or regional committees given the mandate to discuss these questions. A suggested phased evaluative process is presented in Section 3.3 of the report in the discussion of the EVALUATION STAGE field.

3.2.2 Field Responsibility

Completion of fields for each record should be, wherever possible, a cooperative effort which draws from the expertise of different specialists and which is coordinated by a central authority.

Thus, commercial producers of educational software might supply the majority of information for commercially available materials; representative provincial or regional groups might assume the responsibility of collecting information regarding public domain materials generated in their regions; and a coordinating agency would monitor supplied fields of information and supervise the completion of remaining fields.

Such fields would include any which require controlled vocabulary terms, or expertise not available at the provincial or regional level without special training. (See Figure 8 for a more graphic breakdown of these field responsibilities.)

Further discussion of a structure for field format completion and shared responsibility may be found in Section 4.0 of the report.

The success of any information retrieval system which is based on keyword access depends very much upon the consistent application of descriptive terms. Since this application is an intellectual and sometimes arbitrary exercise, consistency may best be ensured by having a minimum number of people do the work and by having clearly established guidelines and rules for these people to follow. Clear guidelines may only emerge after a period of application and experience with this particular medium. It is therefore recommended that such experience be acquired by a core group (a coordinating agency) who will then produce and document thorough guidelines which may enable the eventual transfer of this operation and subsequent field responsibility to individual participants within the cooperative network.

Figure 8

FIELD RESPONSIBILITY

Fields	Commercial Software	Public Domain
ACCESSION NUMBER	CA	CA
PACKAGE TITLE	P * CA	U * CA
SERIES TITLE	P * CA	U * CA
EDITION	P	U
ISPN	CA	U
AUTHOR	P	U
PRODUCER	P	U
DISTRIBUTOR	P	U
COPYRIGHT DATE	P	U
RESTRICTIONS	P	U
COST	P	-
COMPUTER MODEL	P	U
MEMORY	P	U
OPERATING SYSTEM	P	U
LANGUAGE	P	U
STORAGE MEDIUM	P	U
PERIPHERALS	P	U
DESCRIPTORS	CA	CA
CLASSIFICATION	CA	CA
APPLICATION	P * CA	U
INSTRUCTIONAL STRATEGY	P * CA	U
GRADE LEVEL	P * CA	U * CA
SPECIAL USER	P * CA	U
ABSTRACT	CA	CA
EVALUATION STAGE	CA	CA
DISPLAY LANGUAGE	P	U

P = information supplied by producer

CA = information supplied by coordinating agency

U = information supplied by provincial or regional organization (computer user groups, etc.)

P * CA = information supplied by producer with very careful monitoring by coordinating agency

U * CA = information supplied by provincial or regional organization with very careful monitoring by coordinating agency

3.2.3 Regional Differences

Some fields will be affected by regional or provincial differences.

The following are examples of fields containing information which may differ in various provinces or regions of corresponding differences in educational philosophy, procedure, history or terminology:

a) GRADE LEVEL;
b) COMPUTER MODEL and other fields reflecting system requirements;
c) DISTRIBUTOR;
d) SPECIAL USER;
e) DESCRIPTORS;
f) EVALUATION STAGE.

For example, in the discussion of the field, GRADE LEVEL, grades 7-9 are designated *junior*. Ontario would require this category to read *intermediate*.

In a record describing software which runs on several systems a province which is committed to one system may wish the COMPUTER MODEL field and other systems requirement fields to reflect their preferred system. A province should make this kind of exclusive decision regarding fields in the database very carefully, since hardware sytems and habits may change.

Two provinces might each have negotiated distribution rights for a particular package. It would be helpful if the record reflected the provincial agency and contact information unique to each province in the DISTRIBUTOR field.

The SPECIAL USER and DESCRIPTORS fields are examples where terminology may differ radically between provinces.

In addition to the problem of fields which are important to all provinces or regions but which reflect unique differences, a related issue concerns potential optional fields. These fields represent information which may be required by, or is appropriate or unique to one province or region, but not another. Thus, some provinces may require the presence of fields indicating READING LEVEL or PROVINCIAL INSTRUCTIONAL OBJECTIVES while others may not deem this information possible or appropriate.

A number of potential solutions may solve the problems posed by these inconsistencies. Questionable fields may be flagged to indicate that users should consult a provincial guide which attempts to translate terms or provide sources for unique information. This approach seems cumbersome and difficult to coordinate.

In a cooperative but decentralized system, it may be possible to generate records centrally, according to standard specifications, distribute these records in machine-readable form (magnetic tape) to participatants where subsequent changes or enhancements might be made which cater to exact information requirements. This method would ensure the consistency and integrity of the central database while allowing for variation within derived databases.

Alternatively, if the changes required to customize the initial record to the unique needs of participants are straightforward and predictable, perhaps automatic subfiles which accommodate these changes could be generated centrally. Or the changes could be made at the participant or derived database level, forwarded to the coordinating agency, and then entered into a subfile - allowing the decentralized control of information contained in these variable fields.

It may well be that consultation with experts on the delivery system will determine that this flexibility is too costly, not efficient or not possible. In any case, these problems should be addressed by representatives of contributors and users of the database and the systems analysts for the delivery system.

In the discussion of each field definition, (Section 3.3) the field names of those fields which might reflect provincial or regional differences have been asterisked.

3.2.4 Delivery System

The selected delivery system and products of this delivery system may influence field names, display format, definition of individual fields and procedures for gathering information for each field.

Although consideration of a delivery system was not deemed a term of reference for this project, the implications of the above statement clearly indicate that consideration was indeed necessary. It should, therefore, be understood that fields suggested in 3.3 represent information requirements of projected users and may not take into account the intricacies and protocols of various delivery systems. However, the standard description, as defined by the 26 suggested fields, represents a crucial prerequisite in the consideration of an appropriate delivery system.

3.3 Suggested Fields

FIELD NAME: ACCESSION NUMBER

DISCUSSION: Each record available in the database should be accorded an accession number. This number would be important in any subsequent reference to the on-line database. It may or may not be used in any of the print products. The number would be applied by the coordinating agency in order to eliminate duplicate designation.

Such a number would be particularly useful in the event that a subfile of information is established about each record. For example, if a separate file of evaluations (or Evaluative File) is developed to which the user might be referred by the Descriptive File, then the evaluative information about the descriptive record (available in the Evaluative File) could be sought most efficiently by reference to the ACCESSION NUMBER field, rather than by PACKAGE TITLE, etc. Thus, on finding in the Descriptive File that an evaluation exists for *Three Mile Island* in the Evaluative File, a user would record the ACCESSION NUMBER from the (Descriptive File), transfer to the Evaluative File, and request the record by ACCESSION NUMBER rather than title.

The ACCESSION NUMBER could be used to designate characteristics of the record (i.e. availability - public domain or commerical, display language - English or French) which might otherwise require a special field of information. Consultation with the delivery system will determine the usefulness of such a policy.

EXAMPLE: ACCESSION NUMBER: PD 1234

FIELD NAME: PACKAGE TITLE

DISCUSSION: The PACKAGE TITLE field identifies the educational software and provides an access point for educators who have read about or who have heard about a particular program or series of programs and would like to obtain further information about it.

The term "package title" rather than "program title" is recommended in order to underline the importance of the support materials which can accompany a program. These materials can include extensive documentation, audio cassettes, filmstrips, and specialized peripheral devices.

Furthermore, whereas PROGRAM TITLE is reasonably descriptive when referring to stand-alone programs, it is misleading when referring to educational software that contains an integrated series of programs. For example, *Milliken Math Sequences* contains twelve diskettes of twelve related but distinct programs supported by one teacher's guide. To use "program title" to describe this product would perhaps confuse educators who might not know whether the "program" referred to software or to an integrated series of educational materials such as the *Ginn 720* program.

Completion of this [illegible]ld as defined above creates problems w[illegible] is necessary to catalogue a software program included in a collection of loosely related programs which merit their own descriptive and bibliographical record but are stored on one diskette. An example of this type of product is MECC's Elementary Mathematics Volume 1 which contains a number of stand-alone programs useful in elementary mathematics. The documentation for each program is included in a single manual and all programs are collected on one diskette. Individual programs cannot be purchased separately.

If the PACKAGE TITLE is listed as MECC's Elementary Mathematics Volume 1, a teacher looking for information about "Hurkle" and not knowing that it is on the Elementary Mathematics Volume 1 diskette would not be able to find it. In addition according to the definition of "series" outlined in the SERIES TITLE field, the descriptive fields of the record would refer not to the entire diskette, but to individual programs on the diskette. (Thus by definition, "Hurkle" merits its own record; Elementary Mathematics Volume 1 does not).

It is therefore recommended that in cases in which a program is one of a number of unrelated programs collected on one diskette that the PACKAGE TITLE field contain the name of the program followed by the title of the package. For example, "Hurkle" would be listed as Hurkle, Elementary Mathematics Volume 1.

It is suggested that the program title precede the package title to enable teachers to search for programs alphabetically in a print catalogue. If "Hurkle" were included after the package title, teachers would have to know which MECC package contained the program before they could locate it.

The use of "PACKAGE TITLE" to describe products which contain a single program on a single diskette - for example, Three Mile Island - should present no problems.

EXAMPLE:

1. For a package containing only one program:

   PACKAGE TITLE: Three Mile Island

2. For a package containing integrated programs on a number of diskettes:

   PACKAGE TITLE: Milliken Math Sequences

3. For a package containing a collection of unrelated programs on one diskette:

   PACKAGE TITLE: Hurkle, Elementary Mathematics Volume 1

FIELD NAME: SERIES TITLE

DISCUSSION: The concept of a "series" is not uniformly applied by producers of educational software. "Series" or "sequence" or "program" is used loosely to indicate the collective title of successive components (packages or programs) generated by the same producer and related by subject, purpose, form or grade level.

The inclusion of series information, when this designation is made by a producer, is useful for identification purposes (a teacher may be aware of a series name but not the titles of individual components) and as a means of indicating that a particular record is part of a larger sequence of such programs, packages, or components.

However, the rather undisciplined use of the "series" concept by producers poses problems in distinguishing between a PACKAGE TITLE and a SERIES TITLE and particularly in the decision regarding whether each component of a series merits its own record or description or whether one description for the entire series is sufficient.

Figure 9 illustrates the various organizational schemes of components which might loosely be termed "series".

It does not follow that each component of the collection should be listed as a PACKAGE TITLE with the collective title listed in the SERIES TITLE field. This automatically requires the existence of separate records for each component of the collection. This is not always appropriate, as numerous cases exist where a single description of the collection serves to also sufficiently describe each component. Therefore, when choosing PACKAGE TITLE and SERIES TITLE it is recommended that the following rules be applied:

a) When individual components of a collection are distinct enough in format or technique (i.e. different instructional strategies are used because of differences in grade level or topic) that each component merits its own description and/or evaluation, then the title of each component will appear in the PACKAGE TITLE field and the collective title of all components will appear in the SERIES TITLE field with an indication of the extent of the collection where possible. (See examples 3 and 5 below.)

b) When individual components are not sufficiently distinct in format or technique (in spite of differences in grade level or topic) and when one description of the collection is sufficient to describe all of its components, then the collective title will appear in both the PACKAGE TITLE and SERIES TITLE fields. In addition, the SERIES TITLE field should indicate the extent of the collection where possible. (See examples 1, 2, and 6 below)

c) If individual components of a collection are not separately available for distribution then they cannot constitute a series. (See example 4 below)

EXAMPLE:

1. PACKAGE TITLE: High School Physics Programs
   SERIES TITLE: High School Physics Programs (64 programs)
2. PACKAGE TITLE: Comprehension Power Program
   SERIES TITLE: Comprehension Power Program (Levels D-L)
3. PACKAGE TITLE: Pronouns
   SERIES TITLE: Language Arts - Grammar
4. PACKAGE TITLE: Hurkle, MECC Elementary Volume I
   SERIES TITLE:
5. PACKAGE TITLE: Beginning Applesoft BASIC
   SERIES TITLE: Applesoft BASIC
6. PACKAGE TITLE: Critical Reading
   SERIES TITLE: Critical Reading (Levels A-H)

Figure 9

EXAMPLES OF COLLECTIONS OF PROGRAMS

Producer	Collective Title	L	F	T	E	DS	DT
1) American Peripherals	High School Physics Program	✓	✓	X	✓	✓	✓
2) Milliken	Comprehension Power Program	X	✓	✓	✓	✓	✓
3) Milliken	Language Arts	X	X	X	X	✓	✓
4) MECC	Elementary - Volume I	X	X	X	X	X	✓
5) MECC	Applesoft BASIC	X	X	✓	X	✓	X
6) Borg Warner	Critical Reading	X	✓	X	✓	✓	✓

L = same educational level for each component

F = same format or technique for each component

T = same topic for each component

E = same evaluation or description appropriate for each component

DS = each component available separately

DT = components available together (one package)

✓ = Yes

X = No

The collective titles listed above represent a collection of components which are unique because of grade level, format, or topic and which are distributed in a variety of ways.

FIELD NAME: EDITION*

DISCUSSION: As revisions of educational software are constantly being undertaken in response to field test and teacher evaluations, it is essential that the version of the package be indicated. Evidence of revisions illustrates the producer's commitment to a good product and often there have been significant improvements in the revised edition of an educational software package.

Unfortunately, different producers use different means to indicate when a package was developed or whether it has undergone any revisions.

In some cases, a newly updated catalogue will indicate new or revised releases from a company. In some packages, the inside page of the documentation provides a copyright date. In others, a version number such as 3.3 is indicated on the diskette label and/or on the title page of the actual software program. In addition, "revised edition", "expanded" or "updated version" can be used and in some cases, there is no indication at all of the date or version of the package.

It is recommended that the EDITION field should be designated by a version number or the verbal comment used by the producer such as "revised edition", "expanded" or "updated version".

Copyright date would not be used in the EDITION field, but would be entered in the DISTRIBUTION DATE field. If the package is a first version, the EDITION field should be left blank.

EXAMPLE:

PACKAGE TITLE: Milliken Math Sequences

EDITION: Revised Version

FIELD NAME: INTERNATIONAL STANDARD PROGRAM NUMBER (ISPN)

DISCUSSION: The question of the need and feasibility of an international numbering system for books was first discussed at the third International Conference on Book Market Research and Rationalization in the Book Trade held in November, 1966 in Berlin. At that time a number of publishers and book distributors in Europe were considering the use of computers in order processing and inventory control and it was evident that a prerequisite of an efficient machine system was a unique simple identification number for a published item.

Undoubtedly, a similar system for computer programs is advisable. This system would uniquely identify each published program and serve to clearly distinguish similar programs. The International Microcomputer Software Directory designates each entry with an ISPN (International Standard Program Number). Their authority in this regard has not yet been determined. However, inquiries of the publisher (Imprint Software) have been made regarding both authority and procedures for application of such a number. The problem of this assignment is addressed in the document outlining MARC format for machine readable data files:

"Bibliographic Control Numbers and Codes:

The assignment of "standard" control numbers like an International Standard Book Number (ISSN) to machine-readable data files is a problem that requires further investigation. Under what circumstances would an ISBN, an ISSN, a yet-to-be-determined standard MRDF (machine readable data file) number, or a combination of these be used? The existing or proposed standard numbers have slightly different criteria for assignment as described below:

ISBN: The assignment is based on a type of entity (language material, general), a level (monograph), and variations of the printed format.

STRN: (Standard Technical Report Number) The assignment is based on a (sub) type of entity (language material, technical report) regardless of its format (printed, microform, etc.).

ISSN: The assignment is based on the level (serial) regardless of the format (printed, microform, etc.).

If a standard number were created for MRDF, would it apply to the format (machine-readable), or to the entity (language material, or numeric/software)? Level also has to be considered since there is already a precedent with the ISSN to assign a number to a "serial" regardless of its format (which could be machine-readable)."

The treatment of public domain software in this regard would be different, since no publisher is involved. Designation of such a number might be made by the province from which this software (public domain) originates.

EXAMPLE:

1. ISPN: PEI 132
2. ISPN: ALT 073

FIELD NAME: AUTHOR

DISCUSSION: Developers of commercially available courseware are often teams of professionals which include curriculum development and instructional design experts, subject area specialists, and computer programmers. For this reason, the name of the author or authors may not be acknowledged and this field will be left blank. The producer should not be designated as the AUTHOR in these cases.

In public domain software, the developer is generally one person, the author. The development of a software package is beginning to be accepted as a publication and therefore it is essential that wherever possible, the author's name should be included in the record. The AUTHOR field should indicate the full name of the author(s) responsible for the intellectual content of the package. Because of updating problems, contact information for the author should be sought through the producer (for whom contact information will always be given as part of the PRODUCER field).

EXAMPLE:

1. AUTHOR: Denis Simair
2. AUTHOR: Creative Education Consortium

FIELD NAME: PRODUCER

DISCUSSION: The PRODUCER field is intended to name and give contact information for the individual or organization - commercial or non-commercial - with the administrative responsibility for the production or development of the software. The producer may be an established publisher of educational materials such as SRA or it may be a small school district which has commissioned a local teacher to develop a scheduling package and is now making it available to others at cost.

In cases where the author is responsible for production, his or her name should be repeated in this field.

EXAMPLE:

PRODUCER: Hartley Courseware, Inc., P. O. Box 431, Dimondale, Michigan, 48821
(616) 942-8987

FIELD NAME: DISTRIBUTOR*

DISCUSSION: This field provides the user with contact information required in order to acquire a program or package. The name, address and, where possible, the phone number of the distributor should be designated.

A distributor is defined as that organization which has been designated by the author or the producer to reproduce or distribute copies of a package or program. In cases where one company has the exclusive right to distribute a package in Canada, the name and contact information should be provided in the DISTRIBUTOR field.

If a distributor is not cited, it is assumed that:

- the author or producer is fulfilling this function (users should refer to the PRODUCER field for contact information)
- individual provinces have negotiated distribution rights (users should refer to the PRODUCER field for contact information)*
- numerous distributors exist; the statement, "Local Dealers" should be entered in the DISTRIBUTOR field

EXAMPLE:

1. DISTRIBUTOR: JEM Research, Discovery Park, University of Victoria, P. O. Box 1700, Victoria, B. C., V8P 4W2 (604) 477-7246

2. DISTRIBUTOR: Local Dealers

*This is an example of a field which may vary in content from province to province. For instance, British Columbia may want to enter PEMC as the distributor for MECC materials. This would not be appropriate for Ontario. Discussion with designers of the eventual delivery system should consider the accommodation of provincial uniqueness in this field.

FIELD NAME: COPYRIGHT DATE*

DISCUSSION: The COPYRIGHT DATE is defined as the year the package became available for distribution to the public. This field was deemed necessary in order to provide an indication of the state of the art of hardware development and programming tools at the time of the release of the package. It should also assist users in determining a specific version of the package.

EXAMPLE:

COPYRIGHT DATE: 1981

FIELD NAME: RESTRICTIONS*

DISCUSSION: Teachers with limited budgets for the purchase of educational software will be very interested in acquiring or purchasing software which is copyable and alterable. Public domain software is copyable although some authors stipulate that the original program remain unaltered.

School districts have commissioned the development of programs and have authorized its teachers to make as many copies as required.

Provinces and school districts have purchased the right to copy software from organizations such as MECC as a cost effective means of ensuring packages for their schools.

It is important for teachers to be aware of which packages can be copied after an initial purchase, which are free of charge, and which can be altered.

It is therefore recommended that a RESTRICTIONS field be included to indicate whether the developer has given legal permission to copy or alter a program. This field would contain any combination of the following comments regarding restriction information:

Not Copyable
Not Alterable
Consult Producer
None

EXAMPLE:

1. RESTRICTIONS: Consult Producer
2. RESTRICTIONS: None

FIELD NAME: COST*

DISCUSSION: The COST field is essential since in many cases, software selection will be influenced by the prices of packages that offer similar features.

The COST field should include the exact price of all components as specified by the producer rather than by the distributor as prices will vary from one to the other. The amount should specify whether U.S. or Canadian funds and should also include the cost of back-up copy or warranty. It is important to note that this information will, more than likely, change from year to year and should always be verified by a potential purchaser.

In cases where a single program on a diskette is being described as in much of the MECC material, the price should refer to the total package cost.

As it can be assumed that the acquisition of public domain software is the responsibility of the teacher, no costs can be indicated but the COST field should identify the particular package as being "public domain."

EXAMPLE:

COST: $625 U.S., Replacement diskettes - $10 U.S.

FIELD NAME: COMPUTER MODEL*

DISCUSSION: Educational software designed for one computer system will, generally, not run on another. Therefore, it is essential that educators be provided with exact information regarding the type of computer, including any model designation, that the software has been designed to run on.

In the software selection process, a list of educational software which is compatible with specific computer systems is very useful. In a print catalogue, the listing of software packages designed for the same computer system is often the major organizing principle. In an automated system which allows on-line searching, the specification of computer model would be, for many users, the first step in limiting the search.

When a package will run on more than one machine, a number of other fields of information may be affected (OPERATING SYSTEM, MEMORY, STORAGE MEDIUM, LANGUAGE, COST, EDITION, etc.). A single record which attempts to give all combinations of this information may prove too awkward. It is recommended, therefore, that an input form designed to be completed by producers should be set up in such a way that these variable fields can be easily accommodated according to type of machine. It is also recommended that separate records (one for each type run) be generated. This procedure should be verified by consultation with the technical experts of the delivery system who should be able to make comments regarding the respective efficiency, economy and usefulness of three separate records vs one conglomerate record.

EXAMPLE:

COMPUTER MODEL: TRS-80 Model III

FIELD NAME: MEMORY*

DISCUSSION: The MEMORY field refers to the minimum amount of internal or main memory required to run a program. This information is essential to teachers as a program developed to make full use of a 48K memory will not run on a 32K system.

EXAMPLE:

MEMORY: 48K

FIELD NAME: OPERATING SYSTEM*

DISCUSSION: A computer's operating system provides an interface between the user, the educational software, and the hardware. Operating systems for some models of computers have been expanded and revised recently, and therefore, it is important to indicate under which version of the operating system an educational program has been developed.

EXAMPLE:

OPERATING SYSTEM: NEWDOS

FIELD NAME: LANGUAGE*

DISCUSSION: A program written in one language or in one version of a language will not run unless a hardware system supports the specific language or version of the language in which the program was written.

For example, Apple II BASIC is different from TRS-80 or Commodore PET BASIC. Furthermore there are two versions of Apple's BASIC - Applesoft and Integer - and programs written in Applesoft BASIC will not run on Apples which have only the Integer version of the BASIC language unless a firmware card or Applesoft software is purchased.

Therefore, it is essential that teachers be provided with information regarding the specific version of the language used to develop a program.

EXAMPLE:

LANGUAGE: Applesoft BASIC

FIELD NAME: STORAGE MEDIUM*

DISCUSSION: The STORAGE MEDIUM field refers to the material on which the data are recorded. This field is essential to ensure that the medium on which the educational software is recorded is compatible with the user's hardware system and preference.

Entries in this field may include the following:

tape cassette
magnetic tape
ROM cartridge
punched cards
hard disk
aperature cards
5" 1/4 floppy
punched paper tapes
8" floppy
disk pack
other
mark sense cards

EXAMPLE:

> STORAGE MEDIUM: 5 1/4" floppy diskette

FIELD NAME: DESCRIPTORS

DISCUSSION: This field represents the source of keywords or controlled vocabulary terms. These terms might represent several characteristics of the package, but they should, first and foremost, indicate subject content. The lack of specificity inherent in traditional subject heading systems (Library of Congress, Sears) makes this a desirable field.

The exact number of terms need not be standard. The topics covered by one package may exceed those covered by another. Thus, the DESCRIPTORS field of a very simple math package might contain the subject terms MATHEMATICS, ADDITION, SUBTRACTION whereas the DESCRIPTORS field for a more comprehensive package might include MATHEMATICS, ADDITION, SUBTRACTION, MULTIPLICATION, DIVISION, RATIO, PERCENT, and FRACTIONS.

Consideration should also be given to designating descriptors which indicate, for instance, instructional strategy, hardware, grade level, etc. Further study and consultation with specialists needs to address the following issues:

1. If PRECIS-like strings of terms are used, is this the logical field in which to include them?
2. If PRECIS-like strings are used, can they accommodate non-subject or

content terms (indications are that they can) and, if so, can/should fields which previously conveyed this information be eliminated from the record (i.e. INSTRUCTIONAL STRATEGIES, GRADE LEVEL)?

3. How can the task of generating a thesaurus or authority file, from which these terms would be selected, be best managed?

Because of the subjectivity involved in the selection of index terms (descriptors) and because an optimum degree of consistency of these terms is desirable for effective information retrieval, it is recommended that application of descriptors be done centrally.

EXAMPLE:

DESCRIPTORS: Language Arts. Grammar. Comma

FIELD NAME: PERIPHERALS*

DISCUSSION: Peripherals are input/output devices which are used in combination or in conjunction with the computer but are not part of the computer itself. Educational software can be developed which requires specific peripheral devices. Therefore, it is essential that all peripheral devices required to use the program or package be listed. This field should distinguish between required and optional peripherals by the use of a parenthetical statement after the appropriate peripherals. (See example)

There are potential inconsistencies when providing information for this field. The Commodore PET has an integral monitor and it is not appropriate to list it as a peripheral device. However, some programs developed for the Apple II require the use of a colour T.V. or monitor. In this case, "a colour T.V. or monitor" would be listed as a peripheral device.

Because of the variety of models of peripheral devices on the market, particularly for the Apple II, an exact description of the device is most useful. For example, rather than listing "printer", the PERIPHERAL field might specify "an EPSON American MX80 printer." However, economy of record length precludes such detail. Users should be made aware that the nature of specific peripherals should be investigated before purchasing a package.

The following provides a list of the various peripheral devices that might be included in this field:

colour T.V. or monitor
cassette player
black and white T.V. or monitor
tape activator
printer
audio cassette player
music synthesizer
paddles
Supertalker
light pen
Speechlink
plotter
disk drive
card reader
2 disk drives
Corvus network

EXAMPLE:

PERIPHERALS: 1 disk drive, 1 music synthesizer (required); 1 printer (optional)

FIELD NAME: CLASSIFICATION

DISCUSSION: In order to provide for integration of educational software with the various organization schemes used for educational resources, it is recommended that the following classification be applied:

Dewey Decimal Number
Library of Congress Classification Number
Sears Subject Heading

This application would be the responsibility of a central coordinating agency and should present few problems since the actual subject content of most software is very similar. It should not be difficult to derive a list of Dewey Decimal numbers, Library of Congress numbers, and Sears headings appropriate to the various (but limited at this point) topics covered by educational software. This should be verified through consultation with specialists in library science.

EXAMPLE:

1. PACKAGE TITLE: Milliken Math Sequences
   CLASSIFICATION: DDN-511; LC- ;
   SEARS - Mathematics

2. **PACKAGE TITLE:** Hand-Holding BASIC
CLASSIFICATION: DDN-001.64; LC- ;
SEARS - a) BASIC (Computer program languages) b) Programming Language (Electronic computers)

FIELD NAME: APPLICATION

DISCUSSION: For the purpose of identifying programs which have been designed to fulfill specific purposes and to extend the usefulness of the database to include all computerized materials which might be of use to educators, an APPLICATION field is recommended. This field will further assist teachers in locating packages which cannot be searched under specific subject areas or grade levels.

Such a field may include the following categories of applications:

CAI
CMI
CAI/CMI
teacher aid
authoring aids
programming utilities
computer assisted testing
administrative aid
information processing
Computing Science
Computer Literacy
other

The majority of educational software would be included in the "CAI" application category. A package such as SRA's *Classroom Management System* would be assigned to the CMI category whereas Milliken's *Comprehension Power* would be included as CAI/CMI as it contains a management system and CAI programs. CAI programs which contain record keeping facilities for student performance should not be included as computer managed instruction.

"Teacher aid" includes those packages such as crossword puzzle generators in which teachers input their own data into a "shell" of a program.

"Authoring aid", includes packages such as authoring languages or Apple's The Shell Games which enable teachers to author their own educational program without having to know a programming language.

"Programming utility" includes packages such as Dakin 5 or MECC 's Shape Tables which provide programming teachers and students with tools for writing programs more effectively or efficiently.

"Computer assisted testing" includes programs which have been designed to use the computer to determine a student's level of achievement. Computer assisted testing may also be considered an instructional strategy and may be entered in the INSTRUCTIONAL STRATEGY field.

"Administrative aid" includes attendance and scheduling packages which assist educators with administrative tasks in organizing student activities.

The "information processing" category includes packages such as word processors or data management systems which can be used in the school office, in data processing courses or in business education classes.

"Computing Science" includes packages such as MECC's Introduction to Applesoft BASIC which is a tutorial to introduce students to the BASIC program language for the Apple II Plus.

Any programs which have been specifically designed for computer literacy such as SRA's Computer Discovery should be included in the Computer Literacy category.

EXAMPLE:

1. APPLICATION: CAI
2. APPLICATION: ADMINISTRATIVE AID

FIELD NAME: INSTRUCTIONAL STRATEGY

DISCUSSION: There are occasions when teachers will be searching for learning resources which fulfill a specific instructional need. For example, a teacher who has introduced and taught the concepts and skills involved in translating English units of measurement to metric units may be looking for a variety of materials which provide drill and practice to reinforce the teaching. In order to accommodate these instructional needs, an INSTRUCTIONAL STRATEGY field is recommended.

This field may include one or more of the following techniques or strategies:

drill and practice
tutorial
simulation
testing
problem solving
demonstration
educational game
other

Drill and Practice is a form of interactive computer assisted instruction in which students answer a series of questions presented to them. The computer provides feedback on whether an answer is correct or not. Depending on the complexity of the design, the computer may raise or lower the student to an appropriate level, keep track of his performance through a management system, or branch into an information giving or tutorial session.

Tutorial programs usually provide information in the form of textual material with questions based on that material. Depending on the student's response, the program will branch to various options. Usually there is a lot of textual material.

Simulations are models of real life events, objects, or situations. In their simplest forms, they are demonstrations of how things look or work. In their more complex forms, they require student interaction and contain random events which add to the realism. They are useful when the real life situation would involve too much time, expense, or danger.

Testing by computer follows a similar format to drill or quiz programs without the correct answer being shown. The program can be designed to gather information about the validity of the questions and the effectiveness of the teaching.

Problem Solving packages encourage students to develop problem solving techniques and strategies by having them plan the steps and activities involved in reaching the solution to a particular problem. Terrapin's LOGO package would be considered a package to be used in teaching problem solving. There will be some overlap between problem solving packages and simulations but it can generally be agreed that in simulations, the emphasis is on the content whereas in problem solving, the content is used to provide a context for the problem solving process.

Demonstration packages permit students or teachers to enter data which is used by the computer to demonstrate a concept or principle. An example of a demonstration package would be one in which polar coordinates are graphed.

Educational Game describes packages which provide instruction or drill in a game format in which the educational purpose is enhanced or accomplished through the use of the motivating and interest generating features of a game format.

EXAMPLE:

1. INSTRUCTIONAL STRATEGY: Testing
2. INSTRUCTIONAL STRATEGY: Drill and Practice, Testing

FIELD NAME: GRADE LEVEL*

DISCUSSION: As the description in each package record is intended to provide a teacher with information to assist them in selecting packages which appear to be suitable for specific instructional or content needs, the grade level of the intended users is an important parameter in the selection process.

Most currently available educational software has been developed in the United States to satisfy the content and instructional needs of an American curriculum. It is being used by ten provinces and two territories who have no consistent guidelines for indicating which topics, skills and concepts are to be taught at which grade level and who are not talking about the same grade levels when they refer to an educational resource as being appropriate for "intermediate" or "junior" students. Therefore, an American company specifying that their package is suitable for Grade 4 or "junior" level students may not provide a Canadian teacher with accurate information.

There is no consistent method for developers to specify grade level. It is, therefore, recommended that the following arbitrary scheme be established as a guide in the designation of grade level:

Pre-school
Primary (K-3)
Intermediate (4-6)
Junior (7-9)
Senior (10-13)
Post-Secondary

Until the program is evaluated for local needs by trained subject area and grade level specialists, an accurate assessment of the *intended* grade use and actual *suggested* grade use appropriate to the respective provinces cannot be determined. It is also therefore recommended that teachers be advised that there will be inconsistencies and inaccuracies within this field and that the level of the intended user be treated as a broad description of the type of learner who would benefit most from the use of the package.

EXAMPLE:

GRADE LEVEL: Primary, Intermediate

FIELD NAME: SPECIAL USER

DISCUSSION: There are a number of packages which have been developed specifically for the use of special populations of learners. Since the use of the computer has been demonstrated as being effective and cost effective in the teaching of small populations of students with special needs, teachers of these students will be interested in locating packages which might be suitable for their students.

The descriptions included in this field may include the following special users:

physically handicapped
special education
vocational
adult basic education
second language instruction
English as a second language

In cases where a package has been developed for a specific type of student within one of the broad special user categories (i.e. a package for the Trainable Mentally Retarded), the broad category would appear in the SPECIAL USER field and the specific student would be mentioned in the abstract.

EXAMPLE:

SPECIAL USER: Vocational

FIELD NAME: ABSTRACT

DISCUSSION: One of the best sources for descriptive information of the package should be the ABSTRACT field. There are no universally accepted standards for writing an abstract and, consequently, the style and amount of information will vary from one source to another. While the writing of an abstract is a more subjective process than that of compiling a bibliographic citation, there is still a need for some type of intellectual control of descriptive elements to be included.

This control is most easily attained by utilization of two strategies:

a) Provision of a list of topics of types of information to be provided when possible and where appropriate. The list should be logically organized and subdivided according to well-defined intellectual components.
b) Provision for creation of each abstract to be done by a central coordinating agency in order to ensure:

  - standard format
  - standard vocabulary (This is particularly important since the abstract becomes an important field in an on-line search)
  - absence of subjective or evaluative comments

The ABSTRACT should be based on synopses and other information provided by producers (in the case of commercially distributed materials) and authors (in the case of public domain material).

The type of information provided in the ABSTRACT of, for example, a CAI program would include:

Components:

A listing of the entire contents of a package including support documentation (student and teacher manuals) and any additional support materials (audiocassettes, filmstrips)

Purpose:

A brief discussion of the intention of the package. Broad instructional objectives might be stated. This area might include reference to a specific user not mentioned in any other field (SPECIAL USER, GRADE LEVEL)

Topics:

Should indicate those topics within a curriculum subject addressed by the package

Process:

A brief description of what the program "does" and the strategy used to achieve the purpose of the package. This discussion may make reference to such characteristics as:

- type of student reinforcement

- type of student evaluation used (multiple choice, fill in blank)
- allowance for student or teacher specification (degree of difficulty, number of problems)
- use of graphics
- routine in error correction

Other:

Any other information not included above which distinguishes the package from others of its kind or which may prove useful to educators. This might include reference to computer/student ratio, implementation logistics, follow-up activities, and networking.

An ABSTRACT should not contain information available in other fields unless to indicate a greater degree of specificity (which is not possible in other fields).

ABSTRACTS for Administrative, Computer Science, Computer Literacy, Information Processing or any other non CAI/CMI application should focus on the purpose of the package and how the purpose is achieved.

EXAMPLE: See next page.

EXAMPLE: PACKAGE TITLE: Preschool IQ Builder

ABSTRACT: [This package consists of a four
Components page manual and a diskette containing two
related programs: 1) Same and Different;
and 2) Letter Builder.] [Its purpose is to Purpose
help 3-6 year olds develop certain skills that
will be used when they start school.]
[In Same and Different, drill and practice
is provided in distinguishing between letters
Topics or letter-like patterns which are the same and
patterns which are different. In Letter Builder,
the child matches a letter on the screen with
a letter on the keyboard.] [In both activities, Process
the drill becomes progressively more difficult,
a record is kept of the child's progress, an
incorrect answer is indicated by a beep and
a correct answer is rewarded with a musical
series of notes.]

FIELD NAME: EVALUATION STAGE

DISCUSSION: For reasons discussed earlier, a field which gives evaluative information is not appropriate in a descriptive database which, it is hoped, will be made available in the near future. However, if evaluative information is eventually made available, in a phased manner, then a field should reflect the EVALUATION STAGE at which the package may be currently designated.

The following represents recommendations for a phased evaluation procedure. The emphasis, in this context, has been to convey a sense of each stage in a general way. Individual characteristics of each stage are subject to further study and discussion.

Thus, the EVALUATION STAGE field of the Descriptive File might indicate a package to be at:

Stage 1:

- This designation would reflect entrance criteria which must be met in order for a package to be considered eligible for inclusion in the database. These criteria should stipulate that the package:
  - be educational;
  - be operationally ready to run;
  - be available for distribution;

  - be free of glaring non-Canadian content (thereby eliminating, for example, a math package on Measurement which is not metric)

Stage 2:

- This designation would suggest that information concerning published evaluations is available in the Evaluative File. Cross-reference for these purposes might be to:
  - creditable evaluations by organizations which provide, on a regular basis, this type of evaluation (JEM, MicroSIFT, EPIE, Talmis);
  - evaluations published in the literature (The Computing Teacher, etc.)
  - field testing projects in progress - contact information might be made available
- The provision and maintenance of Stage 2 data could easily become a task of the coordinating agency.
- It is not inconceivable that this information could appear in the Descriptive File. Further consideration needs to be given to this possibility.

Stage 3:

- This designation would suggest the completion of an extensive evaluation by subject specialists and trained evaluators using an instrument (or instruments) which has been mutually agreed upon by provinces and regions. Achievement of this stage of evaluation will require:

- extensive research, discussion, and negotiation by provinces to select a suitable instrument;
- establishment of the most efficient and cost-effective system whereby the instrument may be applied;
- further study to investigate how the results of such evaluation might best be implemented, shared, stored, and displayed.

Stage 4:

- This designation would be used by provinces to indicate whether material meets authorized or prescribed standards for an individual province.

It is recommended that one of the uses to which extensive evaluations such as those represented by Stage 3 might be put is to verify information found in the Descriptive File. This represents the most reliable method of maintaining the currency and integrity of the database.

EXAMPLE: EVALUATION STAGE: 1

FIELD NAME: DISPLAY LANGUAGE

DISCUSSION: Although educational software in French is currently difficult to find (most of the existing French material is public domain and teacher written, often adapted from English programs), this subset of the entire collection of educational software is of special interest to Quebec, New Brunswick, and Manitoba, where substantial French populations exist. It is also of potential benefit to provinces offering French Immersion programs (an increasingly popular trend). For this reason, provision should be made for designation of the language displayed by an educational software package.

It may be possible to include this information in the ACCESSION NUMBER field (i.e. FR 12345 or EN 12345). Consultation with the delivery system will verify the more efficient approach.

EXAMPLE:

DISPLAY LANGUAGE: English

3.4 Sample Display Formats

This section gives examples of various display formats appropriate for different users and purposes. An automated database will allow an infinite amount of manipulation of fields. The following formats represent some displays which may be more commonly requested.

Format 1 - field names are not abbreviated
- sample of package subjected to standard description
- inappropriate fields are left blank
- long abstract is used

Format 2 - complete database - type record
- field names are abbreviated
- inappropriate fields do not show in record
- long abstract is used

Format 3 - short display appropriate for students
- short abstract is used

Format 4 - short display appropriate for librarians
- short abstract is used

Format 5 - short display appropriate for teachers

Format 6 - short display of system requirements

Format 7 - short display of instructional information

Format 8 - short display appropriate for browsing an initial set of documents in order to determine whether a fuller description should be examined

```
Format 9  -  print catalogue entry
          -  field names do not appear
```

Field Abbreviations

AN - ACCESSION NUMBER
PT - PACKAGE TITLE
ST - SERIES TITLE
ED - EDITION
IS - ISPN
AU - AUTHOR
PR - PRODUCER
DI - DISTRIBUTOR
CD - COPYRIGHT DATE
RE - RESTRICTIONS
CO - COST
CM - COMPUTER MODEL
ME - MEMORY
OS - OPERATING SYSTEM
LG - LANGUAGE
SM - STORAGE MEDIUM
PE - PERIPHERALS
DE - DESCRIPTORS
CL - CLASSIFICATION
AP - APPLICATION
IN - INSTRUCTIONAL STRATEGY
GL - GRADE LEVEL
SU - SPECIAL USER
AB - ABSTRACT
ES - EVALUATION STAGE
DL - DISPLAY LANGUAGE

Format 1

ACCESSION NUMBER:	12345
PACKAGE TITLE:	Comprehension Power Program
SERIES TITLE:	Comprehension Power Program (Levels D-L)
EDITION:	
AUTHOR:	
ISPN:	1374-17-9
PRODUCER:	Milliken Publishing Co., Inc. 1100 Research Boulevard St. Louis, MO 63132 (314) 991-4220
DISTRIBUTOR:	Local dealers
COPYRIGHT DATE:	1981
RESTRICTIONS:	Not copyable Not alterable
COST:	Single level $150 U.S. 3 levels (12 diskettes) $425 U.S. 3 levels with backup $635 U.S.
COMPUTER MODEL:	Apple II Plus
MEMORY:	48K

OPERATING SYSTEM:	DOS 3.3
LANGUAGE:	Applesoft BASIC
STORAGE MEDIUM:	5 1/4" floppy diskette
PERIPHERALS:	Printer (optional)
DESCRIPTORS:	LANGUAGE ARTS, READING COMPREHENSION, MANAGEMENT SYSTEM, DRILL AND PRACTICE, INTERMEDIATE, JUNIOR, SENIOR
CLASSIFICATION:	DDN-428; LC- ; Sears - English Language - Computer Programs
APPLICATION:	CAI/CMI
INSTRUCTIONAL STRATEGY:	Drill and Practice
GRADE LEVEL:	Intermediate, Junior, Senior
ABSTRACT:	The Comprehension Power Program is made up of nine sets of diskettes. The sets span reading levels four through twelve and are coded by letter, i.e. D-(level 4), E-(level 5), etc. Each set is made up of four diskettes containing twelve Comprehension Power Lessons. Each diskette contains three levels and a Manager Program. Each level can be purchased individually or in a set of three. The intent of the developers is to provide an inductive,

global reading experience. The Program provides managed drill and practice in 25 major reading comprehension skills through levels of increasing difficulty. Five major skill areas are developed: Literal Understanding, Interpretation, Analysis, Evaluation, and Appreciation. Each lesson consists of three parts: a review of new vocabulary, a teacher controlled preview of the selection, and comprehension questions based on a reading of a selection at a teacher or student specified reading rate and level. The management system enables teachers to individualize progress, to allow students to work independently, and to analyze specific skill areas. Feedback is provided through textual comments or optional animated graphics.

EVALUATION STAGE: 1

DISPLAY LANGUAGE: English

Format 2

AN - 12345
PT - Comprehension Power Program
ST - Comprehension Power Program (Levels D-L)
IS - 1374-17-9
PR - Milliken Publishing Co., Inc; 1100 Research Boulevard; St. Louis, MO, 63132; (314) 991-4220
DI - Local Dealers
CD - 1981
RE - Not copyable; not alterable
CO - Single level (4 diskettes) $150 U.S.; 3 levels (12 diskettes) $425 U.S.; 3 levels with backup (24 diskettes) $635 U.S.
CM - Apple II Plus
ME - 48K
OS - DOS 3.3
LG - Applesoft BASIC
SM - 5 1/4" floppy diskette
PE - Printer (optional)
DE - LANGUAGE ARTS, READING COMPREHENSION, MANAGEMENT SYSTEM, DRILL AND PRACTICE, INTERMEDIATE, JUNIOR, SENIOR
CL - DDN-428; LC- ; Sears - English Language - Computer Programs
AP - CAI/CMI
IN - Drill and Practice
GL - Intermediate, Junior, Senior
AB - The Comprehension Power Program is made up of nine sets of diskettes. The sets span reading levels four through twelve and are coded by letter, i.e. D-(level 4), E-(level 5), etc. Each set is made up of four diskettes containing twelve Comprehension Power Lessons. Each diskette contains three levels and a Manager Program. Each level can be purchased individually or in a set of three. The intent of the developers is to provide an inductive, global reading experience. The Program provides managed drill and practice in 25 major reading

comprehension skills through levels of increasing difficulty. Five major skill areas are developed: Literal Understanding, Interpretation, Analysis, Evaluation, and Appreciation. Each lesson consists of three parts: a review of new vocabulary, a teacher controlled preview of the selection, and comprehension questions based on a reading of a selection at a teacher or student specified reading rate and level. The management system enables teachers to individualize progress, to allow students to work independently, and to analyze specific skill areas. Feedback is provided through textual comments or optional animated graphics.

ES - 1
DL - English

Format 3 - Students

AN - 12345
PT - Comprehension Power Program
PE - Printer (optional)
IS - 1374-17-9
AB - This series provides drill and practice in reading comprehension for students at Intermediate through Senior levels. Each lesson reviews new vocabulary, provides a reading selection and appropriate comprehension questions. Student progress may be recorded.

Format 4 - Librarians

AN - 12345
PT - Comprehension Power Program
ST - Comprehension Power Program
IS - 1374-17-9
PR - Milliken Publishing Co., Inc; 1100 Research Boulevard; St. Louis, MO, 63132; (314) 991-4220
DI - Local Dealers
CD - 1981
CM - Apple II Plus
ME - 48K
OS - DOS 3.3
LG - Applesoft BASIC
SM - 5 1/4" floppy diskette
PE - Printer (optional)
DE - LANGUAGE ARTS, READING COMPREHENSION, MANAGEMENT SYSTEM, DRILL AND PRACTICE, INTERMEDIATE, JUNIOR, SENIOR
CL - DDN-428; LC- ; Sears - English Language - Computer Programs
AB - This series provides drill and practice in reading comprehension for students at Intermediate through Senior levels. Each lesson reviews new vocabulary, provides a reading selection and appropriate comprehension questions. Student progress may be recorded.

Format 5 - Teachers

AN - 12345
PT - Comprehension Power Program
CD - 1981
CO - Single level (4 diskettes) $150 U.S.; 3 levels (12 diskettes) $425 U.S.; 3 levels with backup (24 diskekttes) $625 U.S.
DE - LANGUAGE ARTS, READING COMPREHENSION, MANAGEMENT SYSTEM, DRILL AND PRACTICE, INTERMEDIATE, JUNIOR, SENIOR
AB - This series provides drill and practice in reading comprehension for students at Intermediate through Senior levels. Each lesson reviews new vocabulary, provides a reading selection and appropriate comprehension questions. Student progress may be recorded.

Format 6 - System Requirements

AN - 12345
PT - Comprehension Power Program
CM - Apple II Plus
ME - 48K
OS - DOS 3.3
LG - Applesoft BASIC
SM - 5 1/4" floppy diskette
PE - Printer (optional)

Format 7 - Instructional Information

AN - 12345
PT - Comprehension Power Program
ST - Comprehension Power Program
AP - CAI/CMI
IS - 1374-17-9
GL - Intermediate, Junior, Senior
AB - This series provides drill and practice in reading comprehension for students at Intermediate through Senior levels. Each lesson reviews new vocabulary, provides a reading selection and appropriate comprehension questions. Student progress may be recorded.

Format 8 - Browsing

AN - 12345
PT - Comprehension Power Program
DE - LANGUAGE ARTS, READING COMPREHENSION, MANAGEMENT SYSTEM, DRILL AND PRACTICE, INTERMEDIATE, JUNIOR, SENIOR

FORMAT 9 - Print Catalogue Display

PACKAGE TITLE: Comprehension Power Program

SERIES TITLE: Comprehension Power Program
(Levels D-L) 1981

LANGUAGE ARTS, READING COMPREHENSION, MANAGEMENT SYSTEM, DRILL AND PRACTICE, INTERMEDIATE, JUNIOR, SENIOR.
The Comprehension Power Program is made up of nine sets of diskettes. The sets span reading levels four through twelve and are coded by letter, i.e. D-(level 4), E-(level 5), etc. Each set is made up of four diskettes containing twelve Comprehension Power Lessons. Each diskette contains three levels and a Manager Program. Each level can be purchased individually or in a set of three. The intent of the developers is to provide an inductive, global reading experience. The program provides managed drill and practice in 25 major reading comprehension skills through levels of increasing difficulty. Five major skill areas are developed: Literal Understanding, Interpretation, Analysis, Evaluation, and Appreciation. Each lesson consists of three parts: a review of new vocabulary, a teacher controlled preview of the selection, and comprehension questions based on a reading of a selection at a teacher or student specified reading rate and level. The management system enables teachers to individualize progress, to allow students to work independently, and to analyze specific skill areas. Feedback is provided through textual comments or optional animated graphics.

PRODUCER: Milliken Publishing Co., Inc.; 1100 Research Boulevard; St. Louis, MO, 63132;
(314) 991-4220

DISTRIBUTOR: Local dealers

Not Copyable
Not Alterable

Single level $15 U.S.
3 levels (12 diskettes)
$425 U.S.
3 levels with backup $635 U.S.

Apple II Plus
48K
DOS 3.3
Applesoft BASIC
5 1/4" floppy diskette
Printer (optional)

4.0 IMPLEMENTATION PLAN AND RECOMMENDATIONS

The work involved in providing a solution for educators to the problem of information dissemination regarding educational software can be divided into three phases:

Phase 1

- assess needs of educators
- research discipline involved
- define the problem
- generate a plan of action for further work

This report constitutes completion of Phase 1
Time Period Required - February 1982 - June 1982

Phase 2

- designate a body with the authority and mandate to make decisions and monitor further work
- complete a careful analysis of cost and implications and make necessary decisions regarding structure of a delivery system or set of procedures designed to collect and share information
- complete all support tasks required to establish working operating procedures involved in implementing the system

Tasks 1 - 20 as outlined on the Task Analysis chart in Section 4.3 of this report constitute Phase 2.
Estimated Time Period Required - Aug. 1982 - June 1983

Phase 3

- implement operating procedures of the system

- refine and change procedures where necessary
- produce first products of the system and distribute

This phase commences as soon as the processing of returned Input Forms begins. The phase is deemed completed with the production of the first print catalogue.
Estimated Time Period Required - June 1983 - Spring 1984.

4.1 Suggested Steps

The following outlines, in sequence, steps which should be taken to facilitate the exchange of information about educational computing in general and educational software in particular. Included in this implementation plan are current recommendations, as well as steps for further study (additional phases).

Implicit in the plan of action is the continued existence of an advisory committee (Project Review Committee) which assumes the initiative and responsibility for carrying out further action and research.

Following the detailed discussion of Suggested Steps are a Summary of Recommendations and a Task and Cost Analysis.

The suggested steps are:

1) Determine procedures and funding for the provision of some form of coordination of information dissemination activities regarding educational software.

This coordination is deemed necessary in order to maximize use of various resources and finances, minimize duplication of effort and cost, facilitate relations with the private sector (i.e. thus producers of commercial software would be approached only once for information which could be subsequently shared across Canada), best produce an initial and consistent set of documentation upon which to found a database of and finally, to most efficiently address the numerous problems which are inevitable during the development stage of such an undertaking. The need for coordination is further discussed in Section 2.3.1 and 3.2.2 of this report.

> Recommendation #1: That a coordinating agency be designated to complete the implementation plan outlined in this report.

Such an agency might be introduced through one of the following alternatives:

a) The contracting of an independent group on a project basis. This alternative suggests a venture similar to the provincial cooperation which was responsible for this present report. The advantages of such an alternative include the relative ease of selection, which could be accomplished through a "call for proposal" process, and the short term committment required by the provinces. Once the initial project is complete, provinces may consider further involvement depending on results of the project and resources available for continuing work.

b) The establishment of a clearinghouse whose sole responsibility would be the work involved in establishing and maintaining information dissemination activities regarding educational software. This alternative suggests a higher profile and lends a certain amount of prestige to the work which may prove useful in soliciting the cooperation of educators and the private sector. However, the concept of a clearinghouse also implies a higher degree of committment on behalf of the financial supporters - a degree to which provinces may be reluctant to subscribe at this point. In addition, a clearinghouse requires the provision and maintenance of location, staff and overhead - resources which would be less expensively attained through the previous alternative (contracting an independent group).

c) The development of a cooperative system of regional or provincial information dissemination centres which would be managed by a committee of representatives from member provinces or regions. This alternative would provide for greater regional or provincial control and would allow provinces with already extensive, well-developed information gathering facilities and capabilities to make use of those resources. However, such a system would require extensive planning and networking and would be very difficult to achieve during the development stage of a database undertaking. In addition, not all provinces have the resources to partake in such a cooperative effort and would thus be eliminated from participating or would necessarily rely on wealthier provinces to provide for their needs as well.

Section 2.3.1 of this report - Centralized vs. Decentralized Systems - explores further the various structures through which coordination might be achieved. It should be noted that a distributed network of cooperating regional or provincial centres should be the ultimate goal of an information sharing venture. The development of such a network implies a gradual increase in the activity of the provincial or regional centres - to the point of assuming some responsibilities formerly managed by the coordinating agency (i.e. indexing operation, abstract provisions, etc.), but it does not follow that the coordinating agency will eventually become redundant. Such a network will always require and benefit from the efforts of an independent but cooperative coordinating agency, the responsibilities of which will remain the maintenance of the integrity of the database and representation of the individual needs of all users.

The initial focus of the coordinating agency would be on educational software and should be extended at a later date, funds and resources permitting, to include:

a) available literature relevant to educational computing;

b) research in progress;

c) existing educational computing practices, programs and projects;

d) in-service training;

e) curriculum development;

f) activities of relevant organizations and individuals (a people resource file);

g) evaluation;

h) hardware;

i) relevant conferences.

Information would be collected through published and unpublished sources, through the active solicitation of relevant documents and conference proceedings, and through the cooperation of the educational computing community.

Tasks of the selected coordinating agency would include:

a) establishment and maintenance of a database of information;

b) coordination of provincial or regional activities in information dissemination;

c) production of documents for distribution (reviews, reports, catalogues, directories, annotated bibliographies, a newsletter - all based on information collected for and included in the database);

d) response to requests for information from educators at the public, secondary and post-secondary level;

e) establishment of relations and information exchange with non-Canadian groups and potential resources (i.e. MicroSIFT)

The following issues should be carefully addressed:

a) possible sources of funding such as provincial Ministries of Education, Council of Ministers; boards or departments of education; generated funds (royalties, sale of information products and services); faculties of education; commercial suppliers of educational hardware and software;

b) the potential for provincial or regional cooperation and support;

c) the potential for cooperation and support from present educational computing organizations (The usefulness of any central coordination is directly proportional to the cooperation of individuals and/or groups who could make relevant contributions. The success of such a central coordination would clearly depend on the degree of cooperation which might be attained);

d) the precedents and experiences of similarly coordinated concepts (MicroSIFT, ERIC, Alaska On-Line Resource Center, Softswap, Florida Center of Instructional Computing);

e) existing information and computer networks or delivery systems which might be utilized by such an agency in order to minimize initial set-up costs and eliminate duplication of already existing services (FORMAT/NFB, BRS, DIALOG, INFOMART, QL, CANOLE).

2) The first task should be to begin collecting standardized descriptions of educational software packages.

Recommendation #2: That a database of standardized educational software descriptions be established in order to provide a basis for:

a) a selection tool to aid educators in the purchase of educational software; and
b) central cataloguing records

The term database, although it simply implies a collection of information, is intended here to eventually represent a computerized collection, capable of generating certain useful products such as print or on-line catalogues and library products. If records within the database can also provide library cataloguing records for educational software, then a single software package should only ever be catalogued once and this cataloguing record should subsequently be made available to anyone wishing to catalogue this material.

In order to create a database of records, a decision must be made regarding the content and structure required for each record.

3) Decide on data elements or fields to be used in describing educational software.

Recommendation #3: That the 26 fields as defined in Section 3.3 of this report constitute the basis for a standardized description of educational software.

4) Circulate suggested fields and rationales to computer-using educators for comments and possible subsequent revision.

This task might be accomplished in the following manner:

a) generate a contact list of computer-using educators;

b) summarize fields and explanations;

c) design a survey instrument to measure attitude or response to b) which allows for additional comments;

d) circulate b) and c) to members of a) with a letter requesting their comments and cooperation;

e) collect and tabulate results;

f) make revisions where necessary to suggested fields.

5) Decide which materials are to be included in the software database.

The decision regarding inclusion of materials should be based on the following considerations:

a) qualitative entrance criteria;

Recommendation #4: That all software materials described in the database should be:

- educational in nature
- operationally ready to run
- free of non-Canadian material which makes it inappropriate for Canadian students
- available for distribution in Canada

For further discussion refer to the EVALUATION STAGE field in Section 3.3 of this report.

b) a phased inclusion of evaluative material;

Recommendation #5: That software material be subjected to 4 stages of evaluation.

Stage 1

- minimum entrance criteria as suggested in a) above;

Stage 2

- cross-reference to published evaluations available in the literature or from evaluation organizations;

Stage 3

- comprehensive evaluations by trained subject specialists using a standard evaluative instrument;

Stage 4

- designation of provincial authorization or prescription (See discussion of EVALUATION STAGE field in Section 3.3 of report for a more detailed explanation)

c) allowance for separate files within the database;

Recommendation #6: That the database contain at least two separate files - a Descriptive File and an Evaluative File. Records for the Descriptive File should be given immediate priority.

6) Design an organizational scheme to collect descriptions of educational software.

Recommendation #7: That the cooperation of producers of commercial educational software be sought in the task of collecting descriptions about their products.

Recommendation #8: That the cooperation of provincial organizations of computer using educators (ECOO, AACE, etc.) or some other provincial or regional interest group be sought in the task of collecting descriptions of public domain software originating in their province.

Recommendation #9: That an Input Form and accompanying guide, based on the final list of agreed fields of an educational software description, be designed and distributed to the two groups mentioned above (producers and provincial groups) to ensure that all descriptions collected appear in a standard format.

Recommendation #10: That the the coordinating agency be responsible for collection, completion and initial processing of Input Forms, as well as encouraging ongoing submission of such forms.

Recommendations 7-10 might be best implemented in the following manner:

a) Design an Input Form and guide to be circulated.

b) Generate a list of commercial producers of educational software.

c) Design a covering letter which:

- introduces the notion of a database of software descriptions to be used as a selection tool in the purchase of commercial products;
- encourages each producer to complete an Input Form for each of their educational software products which meets the initial entrance criteria (See Recommendation #3);
- encourages the producer to complete and forward an Input Form for each product which becomes available in future;
- lists incentives to the producer for their cooperation (potential sales volume increases by Canadian educators; higher product visibility; consideration for distribution arrangements; potential benefit from information in an Evaluative File; benefits from an intended print catalogue, etc.)

d) Forward a "kit" to each producer containing the letter, a supply of Input Forms and guides, a producer profile information form to be completed by the producer, and a procedure for submission, further inquiry and support.

e) Make contacts in each province with interest groups who would cooperate in the collection of public domain software descriptions. These groups would be responsible for:

- identifying public domain software (or authors of same) generated and available within their province;
- circulating the standard Input Form to authors or other individuals knowledgeable enough about the software to complete the descriptions;
- ensuring that each description represented an example of educational software which satisfied the entrance criteria for the database;
- collecting Input Forms and forwarding to the coordinating agency;
- encouraging the ongoing submission of Input Forms by authors of public domain software within the province.

Groups might accomplish the above through use of their newsletter as a means of contacting authors and software. Consideration might also be given to the establishment of provincial grants or funding in order to encourage speedy collection of information about already existing public domain materials, thus reducing the task of the interest groups to that of establishing structures for collection of information about newly and future produced public domain software only (rather than the archival collection or backlog already in existence).

This step establishes a procedure for a simple, organized, cooperative submission of descriptions of educational software. These completed forms represent the initial makings of a database. A decision must now be made about what to "do" with this information.

7) Decide what products are to be generated by the database.

Recommendation #11: That a print catalogue which can be used as a selection tool by educators and cataloguing records (in card or COM form) which can be used by librarians to organize collected resources are the two products most urgently required at present.

Further work needs to be done to determine the actual structure and appearance of these two products. Representatives of the selected delivery system will need to be consulted and advised.

Recommendation #12: That with reference to the products designated in Recommendation #11, on-line cataloguing records and an on-line product catalogue constitute lower priorties in terms of immediate availability to educators but equal priority in terms of development and delivery system consideration.

It should be understood that if on-line capabilities are to be eventually utilized by educators that they should be planned for now, notwithstanding the fact that present educators are more likely to consult a print catalogue than an on-line catalogue and that school librarians are more likely to request catalogue cards for a library item than a search of an on-line union catalogue.

Paradoxically, a system which produces an on-line database of records can more efficiently supply the so-called manual products (print catalogue and catalogue cards) than a manual system. In effect, it is being suggested that an automated system be developed now with the capability of producing manual products until such time as the on-line capabilities of such a system can be more fully utilized.

8) Select a cataloguing code appropriate for educational software materials.

> Recommendation #13: That the cataloguing rules for machine-readable data files, as set out in The Anglo American Cataloguing Rules (2nd edition) be adapted. Refer to Section 2.0 of this report for further discussion.

Further work needs to be done in order to determine the actual implications of AACR2 and MARC format. Areas still in question include:

a) Adaptation of the 26 fields outlined in Section 3.3 of the report to AACR2 format;
b) Possible consequent redefinition of some of the 26 fields as a result.

(Contacts have already been established with individuals who are both knowledgeable and willing to contribute their expertise and advice in this regard.)

9) Select an indexing method which is appropriate in both an on-line and manual search situation.

> Recommendation #14: That a keyword indexing method be utilized and that serious consideration be given to a PRECIS-type management system of the keywords or descriptors. Refer to Section 2.2.4 for further discussion.

Because the selection of an indexing method is so dependent on selection of a delivery system, it is not possible to phrase Recommendation #14 any more strongly.

10) Select a delivery system which:

- can create a database of descriptions of educational software, resident in Canada;
- can provide library cataloguing services;
- generate catalogue cards or COM;
- generate a quality print catalogue to be used as a selection tool;
- provide on-line access to database records;
- provide expertise, experience, and guidance in database creation;
- can accomodate PRECIS indexing - should this method be deemed appropriate;
- demonstrate the potential to accommodate additional files of information in an educational software database. (i.e. Evaluative File)

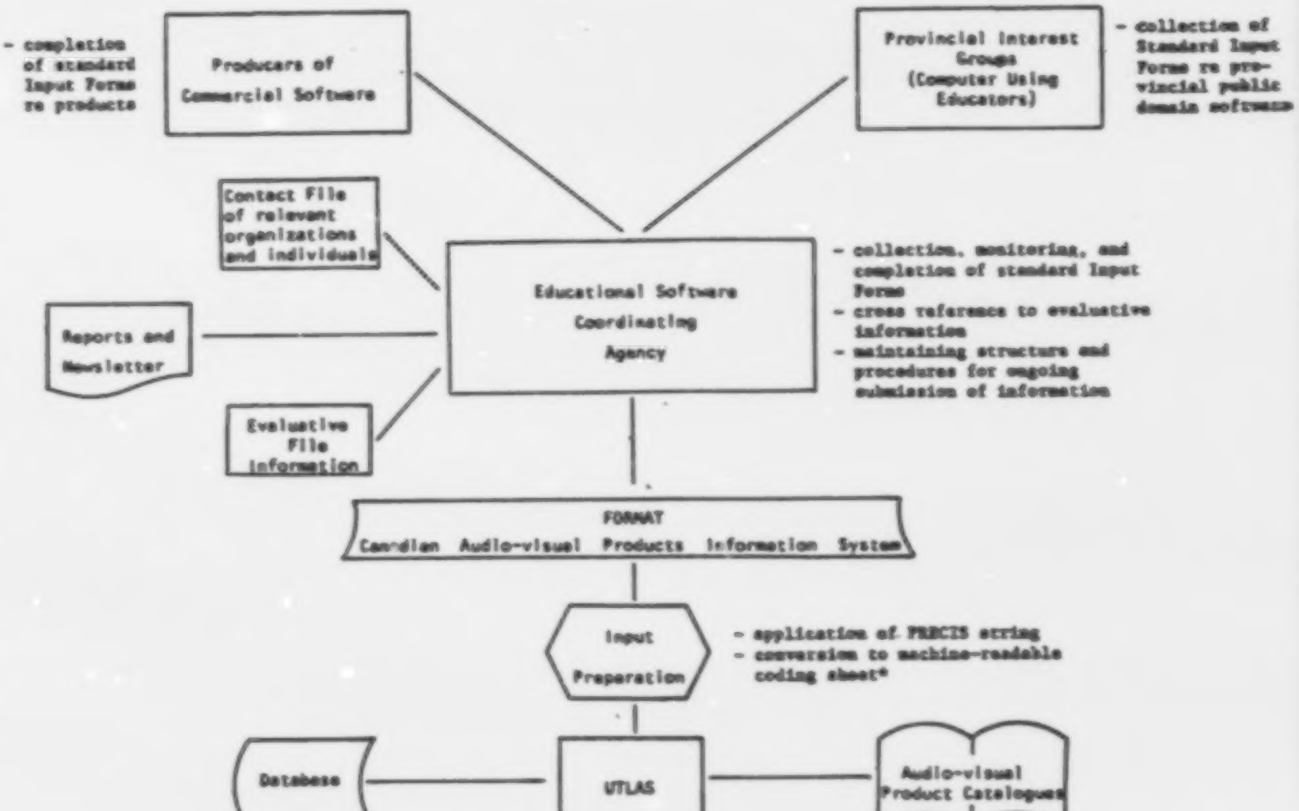
Recommendation #15: That detailed analysis be done to determine the cost, procedures and implications of a delivery system which makes use of the combined resources of the FORMAT program of the National Film Board, the PRECIS program resident at University of Toronto Library Automation Service (UTLAS), and the cataloguing services of UTLAS. See Figure 10 - A Possible Delivery System. Refer to Section 2.3.7 for further discussion.

11) This study might best be initiated by a meeting which would include attendance by representatives of:

a) the present steering committee - or individuals appointed by the committee (Project Review Committee);
b) the coordinating agency;
c) National Film Board (FORMAT)
d) UTLAS
e) current users of PRECIS (York County School Board, ONTERIS)
f) current users of MARC format regarding machine-readable data files

Figure 10

A POSSIBLE DELIVERY SYSTEM


Producers of Commercial Software
Provincial Interest Groups (Computer Using Educators)
Contact File of relevant organizations and individuals
Educational Software Coordinating Agency
Reports and Newsletter
Evaluative File Information
FORMAT
Canadian Audio-visual Products Information System
Input Preparation
Database
UTLAS
Audio-visual Product Catalogues
Utlas Users
Mag. Tape
Micrographics
Database
FORMAT On-line Inquiry
Provincial or Regional Databases
Audio-visual Product Catalogues
Reports & Marketing Data
Dial up
Dial up
Fibos/ Format Users
Other NFB Users
Non NFB Users
Provincial Users

- completion of standard Input Forms re products

- collection of Standard Input Forms re provincial public domain software

- collection, monitoring, and completion of standard Input Forms
- cross reference to evaluative information
- maintaining structure and procedures for ongoing submission of information

- application of PRECIS string
- conversion to machine-readable coding sheet*

* It is possible that these tasks might eventually be completed by the coordinating agency and that records might then be directly input to UTLAS.

g) the JEM Research Team (for purposes of elaboration on the plan suggested in this report.

The agenda of such a meeting should provide a structure for discussion and negotiation regarding costs and procedures of the delivery system in meeting the requirements of users of the database. It is also crucial that such a meeting address the problems posed by unique provincial and regional needs regarding library and print catalogue requirements.

12) The need for information in both official languages should be recognized and allowed for throughout the development of the database.

That is to say that the display languages of the software program should be reflected in the language in which the description appears. It is not necessary that a French and English description be produced for each example of software. It should be noted hat the PRECIS indexing method allows for such bilingual capabilities.

Recommendation #16: That the language of each description reflect the display language of the educational software. Refer to the field DISPLAY LANGUAGE in Section 3.3 of the report for further discussion.

4.2 Summary of Recommendations

#1 That an agency be appointed to commence central creation of an educational software database.

#2 That a database of standardized educational software descriptions be established in order to provide the basis for:

a) a selection tool to aid educators in the purchase of educational software
b) central cataloguing records

#3 That 26 fields as defined in Section 3.3 of this report constitute the basis for a standardized description of educational software.

#4 That all software materials described in the database should be:

- educational in nature
- operationally ready to run
- free of glaring non-Canadian content
- available for distribution in Canada

#5 That software materials be subjected to four stages of evaluation

Stage 1

- entrance criteria (see Recommendation #4)

Stage 2

- cross reference to published evaluations from various sources

Stage 3

- comprehensive evaluations

Stage 4

- optional provincial curriculum match to determine authorization or prescription designation

#6 That the database contain a Descriptive File and an Evaluative File and that records for the Descriptive File be given immediate priority.

#7 That the cooperation of producers of commercial educational software be sought in the task of collecting descriptions about their products.

#8 That the cooperation of organizations of computer using educators (ECOO, AACE, etc.) or some other provincial or regional interest group be sought in the task of collecting descriptions of public domain software originating in their province.

#9 That an Input Form and accompanying guide, based on the final list of fields, be designed and distributed to the producers and provincial groups to ensure that all descriptions collected appear in a standard format.

#10 That an agency be selected for collection, completion, and initial processing of Input Forms, as well as encouraging submission of such forms.

#11 That the database be capable of generating and delivering in the near future:

a) a print catalogue for use as a selection tool in the purchase of software
b) library cataloguing records to aid in the organization of software collections

#12 That the database be capable of generating and delivering at a later date:

- a) an on-line catalogue for educators and students
- b) on-line cataloguing records for librarians

#13 That AACR2 cataloguing rules be adapted.

#14 That a keyword indexing system be utilized and that serious consideration be given to a PRECIS-type management system of the keywords or description.

#15 That a delivery system comprised of FORMAT (National Film Board) and UTLAS (University of Toronto Library Automation Service) be analysed in detail to determine cost, procedures and implications for a database of educational software.

#16 That the language of each description reflect the display language of the educational software (i.e. French packages would be represented by French descriptions).

4.3 Task Analysis

The foregoing discussion of necessary steps to be taken in a cooperative exchange of information about educational software suggests a number of individual tasks. The following Task Analysis chart (Figure 11)

- summarizes the list of specific tasks
- relates each task where appropriate to the corresponding Recommendation
- designates group/s responsible for completion of the task
- provides additional comments regarding resources and time required for completion of each task.

Figure 12 (Phases 1 - 3 Timeline) places the tasks outlined in Figure 11 in the context of the three Phases described at the beginning of Section 4.0 and presents suggested time periods required for each Phase and task within each Phase.

Figure 13 presents a cost analysis for work to be done in Phase 2. It should be noted that these costs do not include work involved in Activity #18 (Evaluation Procedures Study and Collection).

Figure 11

PRC = Project Review Committee
CA = Coordinating Agency
DS = Delivery System

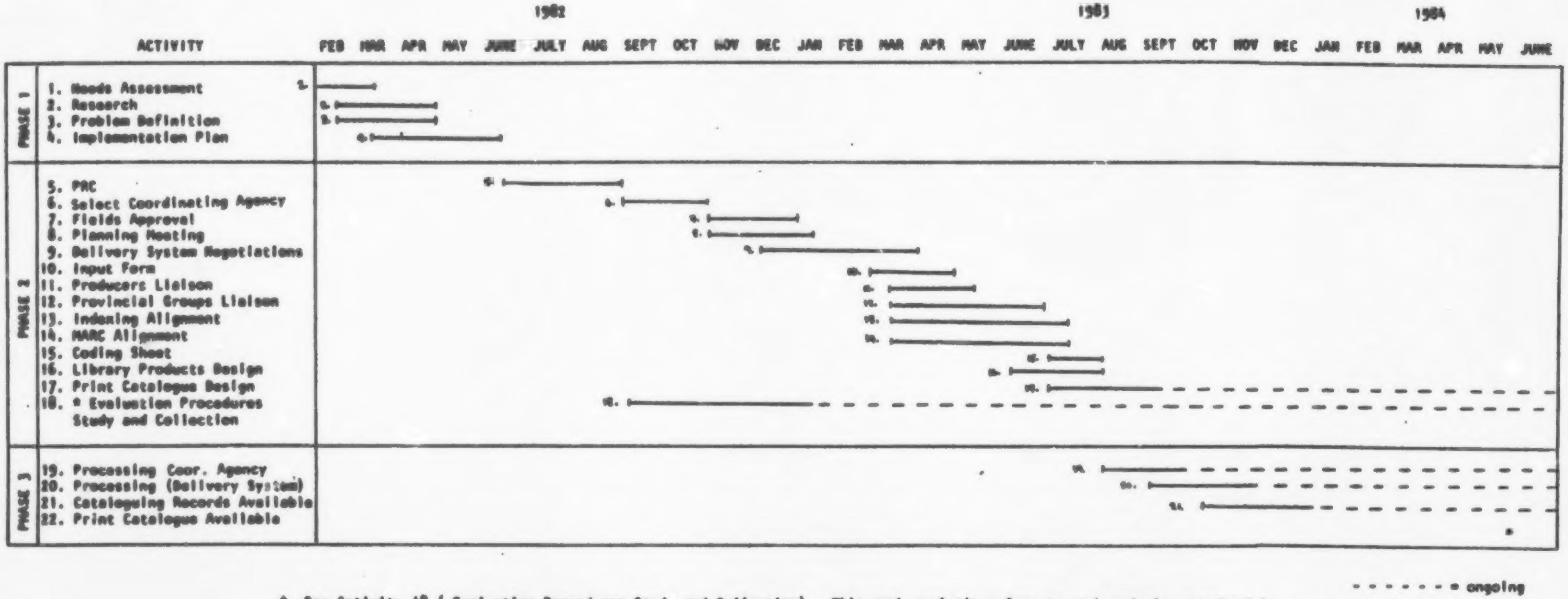
TASK ANALYSIS

	Recommendation	Responsibility			
		PRC	CA	DS	
1. Establish a committee which represents users within participating provinces or regions in a cooperative effort to address the educational software problem and whose mandate is to supervise and authorize future phases of work. (Project Review Committee - PRC)					This step would fall under the jurisdiction of the present Steering Committee.
2. Appoint a coordinating agency to implement Phases 2 and 3 as outlined in Figure 12.	#1	X			This step would represent the first required action of the PRC, established in 1. above and might best be met through a Request for Proposal procedure.
3. Adopt suggested data elements or fields to be used in a standard description of educational software.	#2, #3	X	X		Represents a decision not requiring funding if recommendations are approved. *
4. Circulate suggested fields and rationales to computer-using educators for comments and possible subsequent revision.			X		Two months (include survey and response time).
5. Adopt suggestions regarding materials to be included in the software "database".	#4, #5, #6	X	X		Represents a decision not requiring funding if recommendations are approved.
6. Adopt suggested organizational scheme to collect descriptions of educational software.	#7, #8, #9, #10	X	X		Represents a decision not requiring funding if recommendations are approved.
7. Adopt suggestions regarding products to be generated by a database of educational software.	#11, #12	X	X		Represents a decision not requiring funding if recommendations are approved.
8. Adopt proposed cataloguing code .	#13	X			Represents a decision not requiring funding if recommendations are approved.
9. Adopt proposed indexing method.	#14	X	X	X	Represents a decision not requiring funding if recommendations are approved.
10. Adopt proposed delivery system.	#15	X			Represents a decision not requiring funding if recommendations are approved.
11. Arrange a preliminary meeting with representatives of the delivery system and the coordinating agency to discuss costs, procedures, and further steps.		X	X		Arrangements for this meeting should begin immediately after the establishment of the Clearinghouse.
12. Engage in ongoing consultation and negotiation with representatives of the delivery system in order to refine procedures.			X	X	This process should be continuous.
13. Design an Input Form and guide to solicit standard descriptions of educational software.	#9		X	X	Two months (include consultation with delivery system, travel, and mail time).
14. Establish liaison with and solicit cooperation of commercial producers of educational software in the collection of descriptions of their products.	#7	X	X		Two months (include mailing time).
15. Establish liaison with and solicit cooperation of provincial educational computing groups in the collection of descriptions of public domain software.	#8	X	X		Four months (include travel, consultation and support expenses as well as allowance for mailing time).
16. Detailed analysis including consultation with representatives of the delivery system regarding procedures for application of indexing method.	#14		X	X	Three months (this task may involve special consultant costs).
17. Alignment of 26 fields in the standard description with MARC format for machine-readable data files.			X	X	Two months (this task may involve special consultant costs).
18. Design, in conjunction with representatives of the delivery system, the coordinating agency and the results of 16. and 17. above, a coding sheet to convert data from the Input Form to machine-readable coding.			X	X	One month (allow time for mail and revision process).
19. Design of the print catalogue (including decisions regarding types of indexes and appendices likely to be useful to educators).		X	X	X	This task may span several months and will be ongoing until actual production of the print catalogue (Spring, 1984).
20. Design and approval of library cataloguing products (including decision regarding physical format, availability, access, etc.)		X	X	X	Cataloguing records should be available on-line as soon as the delivery system is operational and able to process input (September, 1983).

* Steps 3 and 5 - 10 will require additional study and funding if proposed solutions are not adopted.

Figure 12

PHASES 1 - 3 TIMELINE



* Re: Activity 18 (Evaluation Procedures Study and Collection) - This task analysis refers to work and time required in order to establish a database of descriptions of educational software. The collection of evaluative material concerning educational software can begin anytime after the establishment of the Coor. Agency. An implementation plan which introduces the working procedures or structure necessary for this collection has not yet been developed. Reference should be made to Recommendation #5 of this report which outlines 4 suggested stages of evaluation and to Section 3.3, which carefully defines these stages in the discussion of the EVALUATION STAGE field. If Recommendation #5 is accepted, the Coor. Agency can begin immediately upon its inception to collect published evaluations to be used in Stage 2 evaluations (literature cross reference) while the procedure and instrument for obtaining Stage 3 evaluations is being determined.

Figure 13

COST ANALYSIS FOR PHASE 2

Activities 7 through 17 of Phase 2 represent all support work necessary to have procedures and a delivery system set up and ready for processing of records by mid-summer of 1983. This work could be completed or coordinated by a staff which should consist of a minimum of the following:

2 professionals representing expertise in:

- educational software
- database management
- information retrieval and dissemination
- resource or library procedures

1 clerical/secretarial

A cost analysis for these services for the period Nov. 1, 1982 to August 1, 1983 (point at which actual processing of returned Input forms may begin) follows:

	Per Month (120 hrs)	9 Month Period
2 professionals @ $50.00/hr.*	$12,000	$108,000
1 clerical @ $25.00/hr.	3,000	27,000
	$15,000	$135,000
15% for travel and expenses	2,250	20,250
	$17,250	$155,250

* Includes Overhead

Volume

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VOLUME II

APPENDICES

Joint Provincial Courseware
Cataloguing and Indexing
Project

JEM Research
June/1982.

APPENDICES

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Appendix IV	Field Formats
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Appendix VI	Clearinghouses - Educational Resources
Appendix VII	Information Retrieval Packages
Apendix VIII	Evaluation of Educational Software
Appendix IX	Precis

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APPENDIX II GLOSSARY

AACR

Anglo-American Cataloguing Rules: The standard rules for bibliographic descriptions for libraries in English-speaking countries. A cataloguing code based on internationally accepted principles of cataloguing practice, which provides rules for print and nonprint formats compatible with the International Standard Bibliographic Descriptions (General). The 1st edition was published in 1967 and departed substantially from previous codes; the second edition (AACR2, 1978) was adopted by the Library of Congress in Jan. 1981.

AACR 2

The second edition (AACR2) was prepared jointly by: The American Library Association, The British Library, The Canadian Committee on Cataloguing, The Library Association and The Library of Congress.

Abstract

A summary of a document.

Access Point

Refers to any element on a catalogue record that typically serves, in a card catalogue, to govern the filing sequence for that card. A distinction should be made between a traditional access point and a non-traditional access point. Examples of the former might be the surname of an author or the word "Dragons" in the book title The Dragons of Eden. An example of the latter (made possible by a mechanized system) would be the word "Eden" in the same title.

Access Time

The time interval between the instant data are called for from the storage unit and the instant data are delivered (read time). The time interval between the instant data are requested to be stored and the instant at which storage is completed. (write time).

Alaska On-Line Resource Information Bank

A computer network supplying information about available instructional resources (people, agencies, materials and programs). The network involves a central computer (Dec 11/70) at the Alaskan Department of Educaton and a microcomputer (GNAT) in each district. Each resource is classified according to a number of ERIC-like descriptors.

Application Software

One or more computer programs written for a specific use.

Automation

1) the implementation of processes by automatic means.
2) automatically controlled operation of an apparatus, process, or system by mechanical or electronic devices that take the place of human observation, effort and decision.

Authority Control

Authority control: The process by which use of an authority file enables the library to : 1) provide consistency of headings for the subjects and names entered in the catalogue; 2) provide references to these headings from forms not used (see references) and 3) provide references from headings used to other related headings used (see also references).

Authority File

The authorized versions of ... The set of all entries of a particular index type in a catalogue. An authority file is crucial for ease of catalogue use. If a user wants all documents about "social studies" but misses some of them because of misspellings and entry of documents under equivalent terms or synonyms (ie. "civic studies", "civics", "Canadian Studies"), the catalogue is not performing one of its most important functions.

The authority file has two functions:

-It serves as the authoritative list of all entries in the catalogue. The authority file has a life of its own. It can exist without documents since its purpose is only to specify the correct form of the entry and the realtionship of an entry to another.

-The authority file also indexes the bibliographic records held by the library.

Authority Record

Authority record: A record indicating the form (and sometimes the choice) of a heading used in the catalogue; or a reference from a heading which is not used to a related term which is used. See Authority file.

BCUC

British Columbia Union Catalogue - a microfiche catalogue of the holdings of the 28 BC libraries constituting the network also known as the BC Union Catalogue. Members have implemented a common on-line catalogue support system, defined and accepted common bibliographic and coding standards, closed their card catalogues and cooperatively built a machine-readable provincial library database. The project uses the services of the University of Toronto Library Automatic System (UTLAS) for derived and original cataloguing.

Bibliographic Database

A database containing citations and sometimes abstracts of printed literature, eg. journal articles, reports, patents, dissertations, conference proceedings, books or newspaper items.

Bibliographic Database (Library)

The place where a library retains the information it has about the documents in its collection. It consists of the library's catalogue and all the files the library uses to manage the housekeeping tasks of acquisitions and circulations. In a traditional library, these files often take the form of the familiar card catalog - 3x5 in. cards arranged in drawers for easy access and search. In recent years , more and more libraries have been putting some of their files in machine-readable form.

Boolean Algebra

A branch of symbolic logic which is similar in form to algebra but, which deals with logical rather than numerical relationships.

Catalogue

An ordered compilation of item descriptions and sufficient information to afford access to the items.

C.I.J.E. Current Index to Journals in Education

A monthly guide to current periodical literature in education, covering articles published in approximately 780 major educational and education-related journals.

Classification

The systematic grouping of information or knowledge into classes.

Clearinghouse

An organization concerned with the organization and dissemination of information relative to a specialized field or discipline.

Code

Either a set of rules used to convert data from one form to another or to write instructions for a computer in either machine or some other language.

COM

Computer output microform - the most common format to replace the card system, the chief argument for which is the ease and economy of wide distribution of copies. This system displays cataloguing information covering dozens of items on one easy to scan "page". These "pages" can be produced on microfilm or microfiche.

Computer

A machine or device which receives data or information as input, processes the input, and returns the results as output.

CAI-Computer Assisted Instruction

An interaction between student controlled display and a response-entry device for the purpose of achieving educational outcomes.

CAL-Computer Augmented Learning

A method of using a computer system to augment, or supplement, a more conventional instructional system. A typical example would be using simulation programs to aid in the problem solving process in a course of instruction.

Computer Based Learning Instruction

A term used to embrace all the present forms of educational computing.

Computer Managed Instruction

A total computer system designed to facilitate management of individualized instruction. The system provides:

1. data collection
2. diagnosis of student performance
3. prescription for varying the level of difficulty as a result of performance
4. reports of the student's progress.

An instructional mode is included in the system.

Computer Based Library System

A computer performs some or all of the work previously done manually. Each system

1. has one or more purposes
2. requires an input of information, materials, or other physical objects.
3. performs specified processing operations on the input.
4. produces end results called output.
5. requires an environment in which to exist.
6. requires computing, software, data communications, human information and other misc. resources in order to operate.

Some tasks might be: cataloguing, acquisition, library management, dataflow for bibliographic, accounting, inventory and patron information.

Computer Literacy

General knowledge of the capabilities, limitations and implications of computer use and familiarity with the capacity of computers to perform specific information-processing functions applied to a variety of circumstances.

Computer Network

A complex consisting of two or more interconnected computers.

Computer Program

A number of instructions which a computer follows in processing data or information.

Concept String

A PRECIS concept meaning:
An ordered sequence of terms preceded by role operators; when string is used alone it generally refers to a concept string.

Conduit

The continuing activity of Conduit is to search for and distribute computer-based learning materials for undergraduate instruction. Conduit packages provide manuals for students, recommendations for using the materials in the classroom and the software.

Courseware

The software and all the supplementary print materials that constitute a package. Thus, a courseware package might include a magnetic tape or floppy disk and also a videotape, a set of microfiche cards, and a set of printed materials. Understood in some regions as a package containing a complete course of study - analagous to the text book.

Database

A collection of information or related file treated as a unit or group. The term is often used synonymously with file.

Database Management System

A special set of systems software which organizes, stores, retrieves, and maintains records in a file or files. A software package that maintains record storage and retrieval in the data base.

DDC

The Dewey Decimal Classification system, a numerical scheme which divides all knowledge into ten main classes with many subdivisions. The numbering is from 000-999. Used especially in public and school libraries for the organization of their books and other media.

Descriptors

Authoritative terms that characterize the substantive content of a document and are used to index and search a database.

Dissemination

The communication, transfer, or movement of information from one location to another by verbal, physical or electronic means.

Dobis-Libis

An integrated, online library database management system (DOBIS is the acronym for Dortmunder Bibliothekssystem or Dortmund Library System. LIBIS is the acronym for Leuvens Integrated Bibliotheek Systeem or Leuven Library System). Includes the major library functions of searching, cataloguing, circulation, & acquisitions processing for a network of libraries. Permits sharing of computer resources and costs while enhancing the value of the shared catalogue. Full authority file control is supported for all indexes to the database.

Educational Resources

Information about persons, agencies, programs or materials which aids instruction.

Educational Software

Computer programs designed to be used in an educational, instructional or training setting.

Edunet

A national American network of colleges & universities formed to promote the sharing of computer-based resources in higher education. Formed in 1974, it is administered by the Planning Council of Educom - a nonprofit organization established to further cooperative efforts among institutions of higher education.

ERIC

A national information system for providing access to the literature of education, descriptions of programs, research and development efforts, and related information that can be used in developing more effective educational programs.

Field

A group of one or more characters that have meaning as a unit. A set of data elements.

Firmware

Software instructions or data that are sorted in a fixed or firm way, usually implemented in a ROM, PROM, or EPROM as opposed to software programs textual or book-like in nature.

Format

Usually refers to the arrangement of the computer's output; the arrangement and sequence of fields in a record.
Most programming languages give the programmer some control over the way the output will appear on the printed page.

Hardware

The physical, mechanical, magnetic, electronic, and electrical components of a computer system.

IMSD

International Microcomputer Software Directory is a listing of 5,000 programs specifically designed for used with microcomputers. There are three sections of the directory for access to the programs; Section 1 by Machine; Section 2 by Subject; Section 3 by Software House.

Index

Any ordered list of terms or keys which guides a user in locating recorded information. A table of references, held in storage in some sequence, which may be addressed to obtain the addresses of other items of data. ie. items in a file.

Identifiers

Additional identifying terms (ex. names of tests or institutions) that are used to index documents in RIE & CIJE but which are not listed in the sources of ERIC Descriptors.

Input-Output Device

Any device which sends data or programs to, or accepts them from a CPU through its I/O bus & I/O port.

ISBD

International Standard Bibliographic Description - an agreed international standard which divides the bibliographic description into certain areas of information and specifies the order of elements of data within each area.

LC

The Library of Congress, Washington, D.C. LC is in many ways a national library for the United States, and is probably the largest in the world. It has devised its own classification system, and list of subject headings, each named after the Library. Because LC provides centralized cataloguing services, the Library of Congress classification system and subject headings have been adopted extensively by university and other large research libraries.

Lessonware

Is defined as short computer programs dealing with particular topics or short sequences of content within courses of study.

Library Automation

The use of an automatic device such as a digital computer to perform some or all operations in library system.

Library System

Organized set of activities, tasks, or operations performed on information,library materials, or physical objects to achieve a specified end result or purpose. ex. acquisitions, cataloguing, circulation, reference or information systems.

Machine-oriented Language

A programming language that is more like a machine language than a human language.

Machine Readable Data Files

Are stored on a variety of media including discs, drums, tapes, punch cards etc. or a collection of related records that are treated as a unit and represented in such a way that they can be read or translated by a machine. Includes computer data files (ie., social survey data, bibliographic files), textual files, computer software (ie., educational programs, commercially-produced software) and representational files (ie., graphic-producing files).

Machine-readable Information

Information recorded on any medium in such a way that it can be sensed or read by a machine.

Magnetic Tape

A tape, usually made of plastic which is coated on one side with a magnetic oxide that will store data by the selective polarization of portions of the surface. Magnetic tape is used for recording audio and video signals and computer data.

Manipulation String

A PRECIS term.

A concept string prepared for computer input through the addition of machine instruction codes which govern the organization of terms into index entries.

MARC format

A generic term referring to bibliographic information that has been encoded and transcribed into a machine - readable form to permit its manipulation. The term is an acronym derived from the phrase Machine Readable Catalog. MARC format is the coding convention under which MARC data may be organized, and it is fast becoming the international standard for automated bibliographic representation. The essential characteristic of MARC formatted records is that they can accommodate a varying number of variable-length data items - affording considerable generality of use.

MECC

MECC (Minnesota Educational Computing Consorium) established July 1973, is an organization created by the four public educational systems in Minnesota to coordinate and provide computer services to students, teachers and educational administrators in the state.

Media Center

An area where a full range of information sources, associated equipment and services from media staff are accessible to students, school personnel and the school community.

Microsift

A clearinghouse for microcomputer-based applications in education involved in collecting, organizing and disseminating information about such applications. It has designed and field-tested an evaluation model for instructional applications based on the cooperation of a network of centers of educational computing.

Mnemonic

A code that simplifies the remembering of information.

MODEM

(Modulator Demodulator) - is a device which permits computers to transmit information over regular telephone lines. Digital electronic signals, generated by the computer, are converted by the MODEM into high and low tones. This process is known as modulation. The tones are a type of analog signal. The modem also converts analog signals to digital signals.

Network

Two or more users organized to share or exchange information and other resources, using established communications links.

Networking

The activity or process of using the services or facilities of a network.

Nicem

The National Information Center for Educational Media was established at the University of Southern California in 1964 to develop an automed storage and retrieval system containing information on nonprint educational media. Working closely with the Library of Congress, NICEM collects, catalogues and disseminates information on educational materials appearing in eight non-book formats. NICEM has developed and published many major indexes to nonprint educational media and also publishes and distributes indexes containing information on special education materials developed by the National Information Center for Special Education Materials (NICSEM).

Non-print media/resources/material

Materials which involve media other than the print medium. Many graphic materials are actually printed, but the term non-print has come to mean those materials which are not textual or book-like in nature.

OCLC

OCLC operates an online computer network used by over 2,400 libraries in 50 states, Canada, and other countries. More than 3,700 remote computer terminals in the network access a very large data base (over 13.5 billion bytes of disk storage) containing information about books and other library materials. Libraries use the OCLC system to catalogue books, order custom-printed catalogue cards, maintain locations information about library materials, and arrange for interlibrary lending of materials.

Online Database

A computer-readable collection of data available for interactive access by users from remote computer terminals. A user sits at a computer terminal in the library, school, office, home, etc. and dials a local telephone number that links the terminal (through the telephone and a coupler or modem) with a computer in some other location. Using a special password, the user gains access to this 'host' computer and requests access to the particular system, which is designed for use by persons without any computer programming background, permits them to retrieve and display specified information.

Onteris - Ontario Educational Resource Information System

A computerized online storage and retrieval system. An answer to the need for efficient sharing of information in the field of education. A potential repository for all types of educational material. An umbrella for three bibliographic databases.

Operating System

A special computer program, or set of programs, which manages and controls the execution of other programs. Usually abbreviated to OS.

Peripheral

Any device or unit which works in conjunction with a computer, but is not part of it, such as cassettes, printers, light pens, graphic plotters, telephone modems, etc.

PLATO

An acronym for Programmed Logic for Automatic Teaching Operations. A computer-based instructional system that uses large computers and plasma display terminals. The system contains thousands of lessons representing 65 fields of study for all levels, from kindergarten through graduate school.

PRECIS

Preserved Context Indexing System developed by the British National Bibliography during 1969 & 1970 as part of the UK Marc Project, a project to develop a system for producing machine-readable bibliographic records. Terms are selected and arranged in an initial order by human intellectual effort; Precis is a computer assisted system. The role of the computer is to eliminate the clerical work, and the attendant risk of error,in manipulating the selected terms so that each significant term will appear in turn as the lead, also preserving its context.

Precision

The ability of the system to avoid retrieval of unwanted items.

Programmer

A person who designs, codes, test, debugs, and revises the detailed sets of instructions for a computer.

Recall

The ability of the system to retrieve wanted items.

Record

A group of related fields of information that is treated as a unit.

Referral Database

Contains references and sometimes abstracts or summaries of non-published information. Generally refers user to organizations ,individuals, audiovisual materials and other non-print material for further information.

Relevance

A characteristic of information that relates to the problem of current subject of interest. It is also a characteristic of documents of value to the request in relation to the information need prompting his request to the system.

Retrieval

The searching, selection, and removal of specific information from a file. The branch of computer technology concerned with techniques for storing and searching large quantities of data and making selected data available. The methods used to recover specific information from stored data.

Search

To examine a set of items for those that have a desired property.

Search Key

An indexing element for a bibliographic or authority record, consisting of a few bits of information derived from the record and which are specific enough to refer only to that record or a small number of other records.

SOFTSWAP

A free exchange of non-commercial public domain instructional software for classroom use. A component of an educational software library for microcomputers in the Microcomputer Centers of the San Mateo County Office of Education (California). Programs are contributed by teachers and educators and evaluated, edited and organized by center staff.

Software

In contrast to hardware; the set of computer programs and related documentation for a computer system or for a specific application.

The programs, processors, routines and procedures which augment a computer system and allow it to be operative.

Software Maintenance

Work required to maintain software in good operating condition.

SPIF

School Practices Information File. An educational database available through BRS which contains descriptions of educational practises, programs, materials and products currently in operation or in use.

SPIN

School Practices Information Network.

String

Any organized sequence of terms or other symbols having semantic content, this refers more specifically to a sequence of words which lacks certain adjuncts of natural language and is set down in the order prescribed by the `grammar' of Precis.

System Software

The software necessary to maintain and operate a computer and facilitate the programming, testing, debugging, and running of application software. Examples of system software include operating systems and utility programs.

TELIDON

Telidon is a Canadian Videotext system. It is primarily graphics (as opposed to text) oriented and may be accessed via both broadcast television channels or cablevision. It can be made interactive or read only and database structure may be user-defined. It is presently at field trial stage.

Terminal

A point or location in a computer or data communications system where data or information can enter or leave. Usually a unit or device for transmitting and receiving data to and from a central processing unit.

Title

For statistical purposes, a title is a publication which forms a separate bibliographic whole, whether issued in one or several volumes, reels, discs, slides or parts. It applies equally to printed materials, such as books and periodicals, and to audiovisual materials and microforms.

Total Systems Concept

The complete integration into one system of all the major functions or functional subsystems of the library organization.

UDC

Universal Decimal Classification, based on the Dewey Decimal Classification but with the significant addition of certain "auxiliaries" which allow a greater degree of specification and synthesis.

Union List

The resulting record of shared resources when two or more parties join together to share resources.

Utility program

A program made available by the operating system to save programmers the bother of writing their own programs to do often needed tasks.

UTLAS

University of Toronto Library Automated System.
80 Bloor St. W. 2dn Floor
Toronto, Ontario, Canada
(416) 923-0890

The UTLAS database provides computer storage facilities for public and educational libraries or institutions. CATSS, the cataloguing support system of UTLAS, handles the software, etc., for the storage of cataloguing records in the database. UTLAS offers a variety of cataloguing services which include data entry, conversion of bibliographic records to machine readable form, access to source cataloguing records generated by the National Library of Canada, Library of Congress, National Library of Medicine, Bibliotheque National du Quebec, as well as cataloguing records generated by all UTLAS users, and production of numerous catalogue products including cards, COM, printed catalogues and magnetic tapes.

APPENDIX III SUBJECT INDEX

ONLINE INFORMATION RETRIEVAL

1. Information Storage and Retrieval Systems for Individual Researchers. Jahoda Gerald. (New York: Wiley-Interscience, 1970).
Description: Concerned primarily with indexes to collections of documents in researcher's offices.

2. The On-Line Revolution In Libraries. Kent Allen, Galvin Thomas J. (New York: Marcel Dekker, Inc., 1978).
Description: `Proceedings of the 1977 Conference in Pittsburgh, Pennsylvania, reviews:
1. the potential of on-line information systems,
2. Impact of on-line systems
3. Training & Retraining of librarians & users.

3. On-line information retrieval sourcebook. Hall, J.L. (London: Aslib, 1977).
Description: Discusses online retrieval as a working tool & can be used as a reference to on-line databases, systems & bibliographic references.

4. Library Systems and Information Services. Lockwood Crosby. (London, Crosby Lockwood, 1970).
Description: Proceedings of the second Anglo-Czech Conference of Information Specialists.

5. The Role of the Library in an Electronic Society. Lancaster, F. Wilfrid. (Illinois: University of Illinois, 1980).
Description: Focuses on the role of the library within the context of technological developments in publishing & related facets of human communication.

6. An Introduction to Indexing and Abstracting for Information Systems. Dataflow Systems Incorporated. (Maryland: Dataflow Systems Inc. 1971).
Description: Discusses indexing (KWIC Keyword-in-context) & abstracting, information retrieval & computer systems (input & output).

7. Vocabulary Control for Information Retrieval, Lancaster, F.W. (Washington,D.C.: Information Resources Press, 1972).
Description: deals with properties of vocabularies for indexing & searching document collections; the construction, organization, display & maintenance of these vocabularies & the vocabularies as a factor affecting the performance of retrieval systems.

8. Information Retrieval Systems. Lancaster, Wilfrid F. (New

York: Wiley & Sons, Inc., 1968).
Description: A complete look at Information Retrieval Systems; traditional retrieval tools, criteria performance, index languages, & evaluation of efficiency of systems.

9. "Online Information Retrieval". Roberts, Steven. (Dublin OH: BYTE Publications Inc. 1981).
Description: Reviews online information retrieval systems (DIALOT, ORBIT, specialized files, (Inspec), ways to do cheaper searching delivery of online services, and a look to the future.

10. Information Storage and Retrieval in the Professional Curriculum. Brunt, Rodney. (Belfast: Lib. Review Vol 29 1980). pp. 15-21
Description: Points out some developments in librarianship which strengthen the arguments for continuation of the teaching of cataloguing & indexing.

11. PRECIS. Ramsden, Michael J. (London: Clive Bingley).
Description: This workbook teaches the elements of the relatively new system of alphabetical subject indexing called PRECIS.

12. "Where Do We Go From Here?" in Online Frontiers. Cochrane, Pauline. (Syracuse: Online, 1981).
Description: This article discusses the need for improvement in online searching by monitoring, advising & correcting user behavior and by redesigning online databases & vocabulary aids.

13. "A Comparison of Three Commercial ONLINE Vendors". Hoover, Ryan E. (ONLINE REVIEW Jan. 1981) pp. 12-21.
Description: Compares five searches run on three major commercial vendors systems: (BRS, DIALOG, ORBIT). The databases searched were CA condensates (2), ERIC, Management Contents and Pollution Abstracts.

14. ONLINE Searching and Computer Programming: Some Behavioral Similarities (Or... Why End Users Will Eventually Take Over the Terminal") Meadow, Charles T. (ONLINE REVIEW Jan. 81). pp.49-52
Description: Discusses the parallels between the history of programming and bibliographic searching. (languages, training of librarians and search costs).

15. "Developing databases for online information retrieval" Levine, Gwen Reveley. (Online Review Vol, 5, No.2, 1981).
Description: This article outlines the steps followed in the development of a database; (Analysis, Design, Programming,

Testing, Loading & Documentation.

16. "The Computer as a Search Intermediary". (ONLINE REVIEW July, (1981).
Description: This article deals with an experimental project at Drexel Univ. dealing with the development of a system called "Individualized instruction for Data Access (IIDA) which assists people in performing online bibliographic searches.

17. "Online in Canada". Janke, Richard V. Wong, Maureen. (ONLINE REVIEW, 1981).
Description: This article explores the operation and dynamics of Computer Search Service at the Univ. of Ottawa. The service elements discussed are: organization & administration, including clientele served, publicity & statistics, physical layout, & systems & databases available for online searching.

18. RICE. Resources in Computer Education. (Oregon: Computer Technology Program, 1982).
Description: Contents of this document are: a definition of RICE, Patterns of user interaction with RICE, catagories of information, structure & definition, and pattern of implementation.

19. MSUS/PALS: "Planning For The Future" in Online Retrieval. Carrison, Dale. (AEDS-81 CONVENTION PROCEEDINGS MINN. May 5-8/81) pp.48-51.
Description: This article describes the online bibliographic access system the Minnesota State University System has implemented for its libraries.

20. "A Design For An Online Bibliographic Database: The Dobis-Libis Database". McAllister, Stratton A. and McAllister Cary. (Information Processing & Management. Vol. 17 No.1 1981) pp.27-38.
Description: This paper reviews the special requirements of a bibliographic database and shows how they are met in the database system of DOBIS-LIBIS (Dortmund Library System-Leuven Library System).

21. Information Retrieval Systems: Characteristics, Testing and Evaluation. Second Edition. Lancaster, Wilfrid F. (New York: A Wiley-Interscience Publication, 1968).
Description: Discusses the requirements (indexing policy, vocabulary control, searching strategies) of users of information systems and the measurement of system performance in terms of efficient & economical satisfaction of those requirements.

22. "Optimizing Search Costs". Folke, Carolyn. (Online Review, 1981).

23. PRECIS. Austin, Derek. (England, William Clowes & Sons, Limited, 1974).
Description: A reference tool for experienced indexers; gives detailed analyses of more cmplex indexing problems, examines subjects which introduce problems not usually encountered in indexing, & deals with matters such as the organization of work in a subject department.

CATALOGUING

1. Library Systems and Information Services. Foskett, D.J., deReuck, A., Coblans H. (London: Crosby Lockwood & Sons Ltd., 1970).
Description: Proceedings of the second Anglo-Czech Conference of Information Specialists.

2. National Conference on Cataloguing Standards. (Ottawa: National Library of Canada, 1970).
Description: Discusses:
1. The National Bibliography.
2. The National Union Catalogue.
3. A centralized Bibliographic Data Bank.
4. Standardization of Cataloguing.

3. Standards for Cataloging Nonprint Materials. Quinly, William J. (Washington, D.C.: Association for Educational Communications and Technology).
Description: This book covers all elements of cataloguing rules which should appear on a catalog card for non-print materials.

4. Cataloguing Standards. Sylvestre Guy. (Ottawa: National Library of Canada, 1972).
Description: The Report of the Canadian Task Group on Cataloguing Standards.

5. "Introduction to Cataloguing and Classification" in Library Science Text Series. Wynar, Bohdan S. (Littleton, Colo., Libraries Unlimited Inc., 1971).
Description: Designed to meet the needs of beginning courses in cataloguing & classification for basic concepts in Dewey Decimal L. of Congress & AACR.

6. An Introduction to Sears List of Subject Headings. Corrigan Philip. (London: Clive Bingley Ltd., 1967).
Description: Gives an introduction to the structure & purpose of Sears List of subject headings & practical use in the formulation of subject headings.

7. Automated Cataloging Systems at the University of Guelph Library. Beckman, Margaret. (Guelph: The Larc Association, 1973).
Description: Contains articles on the Guelph document system, cataloguing, & automation and library management
the use of COM & OCR in cataloguing.

8. Canadian Marc Communication Format: Mini-Marc. (Ottawa:

Canadian MARC Office, 1975).
Description: Mini-Marc is the third in a projected series of communication formats for machine-readable cataloguing records issued by the National Library of Canada.

9. Network Planning Paper. Buchinski, Edwin. (Washington: Library of Congress, 1978).
Description: Information on the configuration of the national database, its logical & physical components & the location of the files etc.

10. Standards for Cataloging, Coding and Scheduling Educational Media. (Washington, D.C., Department of Audiovisual Instruction, 1968).
Description: Contains studies which summarize the fields required in the reporting of information about media and attempts to specify how some of this essential information can be coded for computerized storage & retrieval.

11. Bibliographic Data Bases in Canadian Degree-Granting Institutions. MacLean, Ian A. (IAS Information Automation Services, 1981).
Description: Study to identify databases which exist in Canada as a preliminary to the preparation of specifications relating to needed network interconnections.

12. Information Storage and Retrieval in the Professional Curriculum. Brunt, Rodney. (Lib. Review Vol 29, 1980). pp. 15-21.
Description: Points out some developments in librarianship which strengthen the arguments for continuation of the teaching of cataloguing & indexing.

13. Standards for Cataloging nonprint materials. Quinly, William. (Washington, D.C. Association for Educational Communications & Technology, 1970).
Description: Elaboration of the AACR rules & suggestions for variations to suit the needs of catalogers in media centers.

14. Conversion of Retrospective Catalog Records of Machine-readable Form. Avram, Henriette. (Washington, Recon Working Task Force, 1969).
Description: "A Study of the Feasibility of a National Bibliographic Service."

15. Cataloguing Rules. Furlong, Norman. Platt, Peter.

(Birmingham: School Library Association, 1976).
Description: A simplified version of Anglo-American Cataloguing Rules, together with rules for cataloguing non-book materials.

16. "Mainstreaming Media Center Materials". Van Rogers, JoAnn. (School Library Journal, 1981).
Description: Discusses the adoption of AACR2 in school libraries and the importance of standardization bibliographic for resource sharing possiblities.

17. Cataloguing Standards. Sylvestre Dr. G. (Ottawa: National Library of Canada, 1972).
Description: "The Report of the Canadian Task Group on Cataloguing Standards".

18. Ten Ways to Profit from a Long Engagement. Thompson James. (American Libraries, 1981).
Description: Arguments in favour of a one year delay for adoption of the Anglo-American Cataloging Rules, 2nd edition; (Lib. of Congress).

19. "Nonprint Cataloging: A Call for Standardization". Rogers, JoAnn. (American Libraries, 1979).
Description: A survey of descriptive cataloguing of multimedia materials in schools for bibliographic standardization.

20. "Building an On-Line Bibliographic/MARC Resource Data Base for Machine-readable Data Files". Dodd, Sue A. (Journal of Lib. Automation, 1978).
Description: This article explains how a bibliographic database of machine-readable data files (MRDF) was conceived & how such an informational resource would benefit the general user.

21. "Towards a National Software Library" in Educational Media International. Walker, David D. (Educational Media International).
Description: Discusses the problems of cataloguing computer software in libraries.

22. "A Design for an Online Bibliographic Database: The Dobis-Libis Database".McAllister, Stratton A. McAllister, Caryl. (Information Processing & Management Vol.17. No.1 1981) pp. 27-38
Description: This paper reviews the special requirements of a bibliographic database and shows how they are met in the database system of DOBIS-LIBIS (Dortmund Library System-Leuven Library System).

23. Anglo-American Cataloguing Rules. Gorman, Michael and Winkler, Paul W. (American Library Association/Chicago, Canadian Library Association/Ottawa, 1978).
Description: This edition of the rules incorporates numerous agreements on the development of rules in the first edition and is based on a reconciliation of the British and North American texts of that edition. These rules are designed for use in the construction of catalogues and other lists in general libraries of all sizes.

INDEXING

1. Generating and Printing Indexes by Computer. Campey Lucille H. (London: Aslib,1972).
Description: This report covers the use of computers in formatting indexes & in generating subject index entries from humanly assigned input or parts of the text of a document.

2. An Introduction to Index Language Construction. Ramsden, Michael J. (London: Clive Bingley, 1974).
Description: Provides instruction in the rudiments of index language instruction, to arrive at either a classification scheme, alphabetical list of subject headings or a thesaurus.

3. Languages of indexing and classification. Hutchins W. J. (England: Peter Peregrinus Ltd., 1975).
Description: An examination of the basic features of indexing & classification in terms of linguistic structures & functions.

4. PRECIS. Ramsden, Michael J. (London: Clive Bingley, 1981).
Description: A workbook for students of librarianship.

5. "XMARC: A System for Experimental Indexing and Searching of MARC Records" in Journal of Education for Librarianship. (Association of American Library School, 1979).
Description: A set of computer programs, called XMARC, is described. This system provides students with a simplifed means of writing programs for the automatic indexing of an experimental collection of MARC records. The indexes so created then become part of an on-line data base. XMARC also provides means for searching such a data base.

6. Vocabulary Control for Information Retrieval. Lancaster, F.W. (Washington, D.C.: Information Resources Press, 1972).
Description: Deals with properties of vocabularies for indexing & searching document collections; the construction, organization, display & maintenance of these vocabularies; & the vocabularies as a factor affecting the performance of retrieval systems.

7. An Introduction to Indexing and Abstracting for Information Systems. (U.S.A.: Dataflow Systems Inc., 1971).
Description: Discusses indexing (KWIC keyword-in context) & abstracting, information retrieval (scan-match) & computer systems (input & output).

8. Information Retrieval Systems. Lancaster, Wilfrid, F. (New York: John Wiley & Sons, Inc., 1968).
Description: A complete look at Information Retrieval Systems;

traditional Retrieval tools, criteria performance, index languages, & evaluation of efficiency of systems.

9. Information Storage and Retrieval Systems for Individual Researchers. Jahoda, Gerald. (New York: John Wiley & Sons, 1970).
Description: Concerned primarily with indexes to collections of documents in researcher's offices.

10. "Online and Print Information Services are not always Equivalent for All Users". Garfield, Eugene. (Database, 1980).
Description: An article describing the benefits & the necessity of a printed index as opposed to online search services.

11. PRECIS. Ramsden, Michael J. (London: Clive Bingley).
Description: This workbook teaches the elements of the relatively new system of alphabetical subject indexing called PRECIS.

12. Information Retrieval Systems: Characteristics, Testing and Evaluation. Lancaster F. Wilfrid. (New York: John Wiley & Sons).
Description: Discusses the requirements (indexing policy, vocabulary control, searching strategies) of users of information systems and the measurement of system performance in terms of efficient & economical satisfaction of those requirements.

13. PRECIS a manual of concept analysis and subject indexing. Austin, Derek. (London: The Council of the British National Bibliography, Ltd., 1974).
Description: A reference tool for experienced indexers; gives detailed analyses of more complex indexing problems, examines subjects which introduce problems not usually encountered in indexing, and deals with matters such as the organization of work in a subject department.

14. Information Storage and Retrieval in the Professional Curriculum. Brunt Rodney. (Belfast: Lib. Review Vol 29, 1980). Pg. 15-21
Description: Points out some developments in librarianship which strengthen the arguments for continuation of the teaching of cataloguing & indexing.

15. "Building an On-Line Bibliographic/MARC Resource Data Base for Machine-readable Data Files". (North Carolina: Journal of Lib. Automation, Dec. 1978).
Description: This article explains how a bibliographic data base of machine-readable data files (MRDF) was conceived & how such an

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LIBRARY NETWORKING

1. Bibliographic Data Bases in Canadian Degree-Granting Institutions. MacLean, Ian A. (Canada: IAS Information Automation Service, 1981).
Description: Study to identify databases which exist in Canada as a preliminary to the preparation of specifications relating to needed network interconnections.

2. Network Planning Paper. Buchinski, Edwin J. (Washington: Library of Congress, 1978).
Description: Information on the configuration of the national database, its logical & physical components & the location of the files etc.

3. Canadian MARC Communication Format: Mini-MARC. (Ottawa: National Library of Canada, 1975).
Description: Mini-MARC is the third in a projected series of communication formats for machine-readable cataloguing records issued by the National Library of Canada.

4. Library Systems and Information Services. Foskett, D.J., de Reuck, A., Coblans, H. (London: Crosby Lockwood & Son Ltd., 1970).
Description: Proceedings of the second Anglo-Czech Conference of Information Specialists.

5. The Role of the Library in an Electronic Society. Lancaster, Wilfrid F. (Illinois: The Board of Trustees of the University of Illinois, 1980).
Description: Focuses on the role of the library within the context of technological developments in publishing & related facets of human communication.

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Description: Proceedings of the 1977 Conference in Pittsburgh, Pennyslvania, reviews

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9. OCLC. Marusin, Albert F. (New York and Basel: Marcel Dekker, Inc.).
Description: Its Governance, Function, Financing, and Technology.

10. The Structure and Governance of Library Networks. Kent Allen, Galvin, Thomas J. (New York and Basel: Marcel Dekker, Inc., 1978).
Description: This book contains the proceedings of the 1978 Conference in Pittsburgh, Pennsylvania, Co-sponsored by National Commission of Libraries and Information Science and University of Pittsburgh.

11. The Identification of Data Elements in Bibliographic Records. Curran, Ann T., Avram, Henriette D.
Description: "Final Report of the Special Project on Data Elements for the Subcommittee on Machine Input Records (SC-2) of the Sectional Committee on Library Work and Documentation (Z-39) of the United States of America Standards Institute".

12. Developing Computer-Based Library Systems. Corbin, John. (The Oryx Press, 1981).
Description: A practical handbook and guide for the Librarian untrained in systems development & responsible for developing a computer based system. Emphasis on planning, organization, management & a step-by-step process of a systems project.

13. Edunet. Brown, George W., Miller James G., Keenan Thomas A. (New York: John Wiley & Sons, Inc., 1967).
Description: Report of the summer study on information networks - a look at network functions, design, & applications.

14. Canadian Union Catalogue Task Group Final Report to the National Librarian of Canada. (Canada: National Library of Canada, 1976).
Description: A report with the objectives of equalizing

opportunity for access to information, & making more cost-effective use of total Canadian library resources.

15. Towards More Effective Nationwide Library and Information Networking in Canada. Duchesne, R.M., Guenter D. A., Islam M. (Ottawa: National Library of Canada, 1980).
Description: Describes National Library programs relating to computerized library network development in Canada.

16. Third Open Conference on Information Science in Canada. Marshall, Eric. Pare, Marcel. (Quebec: 1975).
Description: An overview of the development of information science in Canada, copies of technical sessions & contributed papers.

17. Proceedings of the Seventh Canadian Conference on Information Science. (Canadian Association for Information Science, 1979).
Description: Theme of the conference was "sharing resources -sharing costs", with a purpose of major exchange of knowledge experience & views in the field of library & information science.

18. Network Planning Paper. (Washington: Dataflow Systems Inc., 1978).
Description: A glossary of functional terms developed by Dataflow Systems Inc. of Bethesda, Maryland used in the field of library networking.

19. Library Networks, 1976-77. Martin Susan K. (New York: Knowledge Industry Publications, Inc., 1976).
Description: Describes the status of library networks, & discusses issues in network development & implementation.

20. Overview of Computerized Library Networking in Canada. Duchesne, R.M., Islam M., Guenter D.A. (Ottawa: National Library of Canada, 1979).
Description: Contains information on
1) Principal federal & provincial agencies concerned with library networking in Canada.
2) Incompatabilities among on-line computerized bibliographic systems.

21. Professional Resources for Teachers. Church, John S., Burt, Howard R., Kaufman, David M., Morrison, Christine. (Vancouver: British Columbia Teachers' Federation, 1974).
Description: The generating force behind this study was the need

to make available to teachers current books, journal & audio-visual materials.
The contents include a survey of the situation at resource centers in B.C. & recommendations.

22. "British Columbia Library Network". Shoffner Ralph, Madden Mary A. (Richmond: British Columbia Union Catalogue, 1980). Description: This contains information about the feasibility substudy. The purpose was to collect financial, operation & other data concerning the alternatives of continuing with UTLAS, & of replicating the Washington Library Network System & Data Base.

COMPUTER NETWORKING

1. "Alaska ON-line Resource Information Bank". (AEDS-81 Convention Proceedings Minn.MN May 5-8/81). Van Dusseldorp, Ralph.
Description: Describes the computer network established in Alaska to provide schools with information on instructional resources available.

2. "The Documentation and Formative Evaluation of a Statewide Instructional Computing Network in the State of Minnesota. (Volumes 1 and 11)" in Education, General. LaFrenz, Dale.
Description: This thesis documented and formatively evaluated all aspects of MECC's Instructional Services. The study was designed to be useful to a national audience of educators interested in transportability of the MECC model, state decision makers who judge MECC's success, and local project developers responsible for refining the operational processes and procedures of MECC Instructional Services.

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Description: Studies which summarize the fields required in the reporting of information about media and attempts to specify how some of this essential information can be coded for computerized storage & retrieval.

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15. Canadian MARC Communication Format: Mini-MARC. (Ottawa: National Library of Canada, 1975).
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LIBRARY AUTOMATION

1. Bibliographic Data Bases in Canadian Degree-granting Institutions. MacLean, Ian A. (Canada: National Library of Canada, 1981).
Description: Study to identify databases which exist in Canada as a preliminary to the preparation of specifications relating to needed network interconnections.

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Description: Its Governance, Function, Financing, and Technology.

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Description: This workbook teaches the elements of the relatively new system of alphabetical subject indexing called PRECIS.

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Description: A reference tool for experienced indexers gives detailed analyses of more complex indexing problems, examines subjects which introduce problems not usually encountered in indexing, and deals with matters such as the organization of work in a subject department.

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7. "Ten Ways to Profit from a Long Engagement". Thompson, James. (Baltimore: American Libraries, 1981).
Description: Arguments in favour of a one year delay for
    1) Adoption of the Anglo-American Cataloging Rules, 2nd Edition:
    2) The "freezing" of its catalogs (separation of pre-AACR2

card catalogs from post-AACR2 automated catalogs).

3) Abandoment of "superimposition" (systematic exceptions to AACR1).

8. Conversion of Retrospective Catalog Records to Machine-readable Form. Avram, Henriette D. (Washington: Library of Congress, 1969).
Description: A study of the feasibility of a national bibliographic service.

9. Automated Cataloging Systems at the University of Guelph Library. Beckman, Margaret. (Ontario: The Larc Association, 1973).
Description: Contains articles on the Guelph document system, cataloguing automation and library management, the use of COM & OCR in cataloguing.

10. "MSUS/PALS: Planning for the Future". (AEDS-81 Convention Proceedings Minn. May 5-8/81). Carrison, Dale K.
Description: This article describes the online bibliographic access system the Minnesota State University System has implemented for its libraries, utilizing a UNIVAC 1100/80A computer. The multiple institution database, consists of over 1.6 million bibliographic records, and accessed by 86 terminals at ten sites. The online catalog provides a versatility and flexibility not possible with the more static and fixed library card and COM catalogs and extends access to information recources by use of descriptive term searching and the ability to combine and limit search terms.

11. Developing Computer-based Library Systems. Corbin John. (Oryx Press, 1981).
Description: Outlines the elements of computer based library systems. Discusses requirements, evaluations & comparisons, designs, acquisitions of hardware & software, & system implementation.

12. "A Clearinghouse for Educational Applications of Microcomputers". (AED8-81 Convention Proceedings Minn. MN May 5-8/81). Holznagel, Donald C.
Description: This article describes MicroSIFT, a clearinghouse for microcomputer-based applications in education, established at the Northwest Regional Educational Laboratory. It is engaged in collecting, organizing and disseminating information about such applications. It has designed and field-tested an evaluation model for instructional applications based on the cooperation of a network of centers of educational computing.

13. "Communications" Gapen, Kaye D. (Journal of Library Automation, Vol. 14. No. 1, 1981).
Description: This is a summary of a paper written on the consideration of the feasibility as well as the benefits, disadvantages, and consequences of simplification of the MARC formats for bibliographic records.

14. Report on Utlas System Upgrade in UTLAS Newsletter Vol.6 No.11 and 12 November-December 1981. (Toronto, Utlas).
Description: The UTLAS Newsletter is a monthly publication of UTLAS (University of Toronto Library Automation Systems).

15. Federal Libraries, and Dobis. (Ottawa: Government of Canada, 1981).

Description: Contains background information on federal library involvement with the Dobis system; a summary of federal library requirements compared to Dobis capabilities; and a description of the general direction preferred by federal libraries for Dobis development.

16. Proceedings of the Seventh Canadian Conference on Information Science. (Banff, Alberta: 1979).
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SOFTWARE EVALUATION

1. "The Documentation and Formative Evaluation of a Statewide Instructional Computing Network in the State of Minnesota. (Volumes 1 and 11)". LaFrenz, Dale Eugene. (Minnesota, 1978). Description: This thesis documented and formatively evaluated all aspects of MECC's Instructional Services. The study was designed to be useful to a national audience of educators interested in transportability of the MECC model, state decision makers who judge MECC's success, and local project developers responsible for refining the operational processes and procedures of MECC Instructional Services.

2. "Sources for and Evaluation of K-12 Microcomputer Software" (AEDS-81 convention proceedings May 5-8). Judd, Dorothy H. pp. 150-156. Description: Reports on the first survey research in Illinois addressed to discovering teacher's knowledge of software sources, and opinions on the effectiveness of specific software sources. ex. magazines, MECC.

3. <u>Science Education and Computers in Canadian Schools</u>. Fischer Linda, Brown Heather-Ann. (Canada, 1982). Description: A Manuscript Report prepared for "Science Education in the Computer Age," a workshop sponsored by the Science and Education Committee of the Science Council of Canada, 25-26 March 1982.

4. <u>RICE Resources in Computer Education, A Prospectus</u>. 2/5/82. (Oregon: 1982). Description: Contents of this document are: a definition of RICE, Patterns of user interaction with RICE, catagories of information, structure & definition, and patterns of implementation.

5. "Softswap: The Evaluation and Dissemination of Non-commercial Teacher Created Software". Lathrop, Ann. (AEDS-81 Convention Proceedings Minn. May 5-8) pp. 173-175 Description: Describes `Softswap' - an educational software library for microcomputers established in the Microcomputer Center of the San Mateo County Office of Education in Redwood City, California. It is a joint project of the County Office and Computer-Using Educators (C.U.E.). The non-commercial public domain programs contributed to the Center by teachers and other educators have been evaluated, edited and organized into the SOFTSWAP, a free exchange of instructional software for classroom use.

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Description: The generating force behind this study was the need to make available to teachers current books, journals & audio-visual materials. The contents include a survey of the situation at resource centers in B.C. & recommendations.

4. Educational Technology A Handbook of Standard Terminology and a Guide for Recording and Reporting Information about Educational Technology. (U.S. Department of Health Education, and Welfare/Education Division).
Description: A handbook to help people in gathering, compiling, and interpreting data relating to the application of technology to instruction.

5. NICEM: Index to Nonprint Special Education Materials. (Southern California: National Information Center for Special Education Materials, 1979).
Description: This article contains a portion of the NICEM data base developed at the Univeristy of Southern California. Includes 5,192 abstracts of media and materials selected for use by parents of exceptional children, special education teachers and other professionals.

6. "Mainstreaming Media Center Materials:" in SLJ School Library Journal; April 1981. (SLJ School Library, 1978).
Description: Discusses the option of AACR2 in school libraries and the importance of bibliographic standardization for resource sharing possibilities.

7. Science Education and Computers in Canadian Schools. Fischer

Linda. (Canada: Science Council of Canada, 1982).
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DATABASE MANAGEMENT

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Description: Information on the configuration of the national database, its logical & physical components & the location of the files etc.

7. Information Retrieval Systems: Charactersitics, Testing and Evaluation. Lancaster Wilfird F. (New York: John Wiley & Sons, 1968).
Description: Discusses the requirements (indexing policy, vocabulary control, searching strategies) of users of information systems and the measurement of system performance in terms of efficient & economical satisfaction of those requirements.

8. "XMARC; A System for Experimental Indexing and Searching of MARC Records". (Journal of Education for Librarianship Fall 1979/Vol.20, No.2). Swanson, Don R.
Description: A set of computer programs, called XMARC, is described. This system provides students with a simplified means of writing programs for the automatic indexing of an experimental collection of MARC records. The indexes so created then become part of an on-line data base. XMARC also provides means for searching such a data base.

9. "Developing databases for online information retrieval". (Online Review, 1981). Reveley, Gwen.
Description: This article outlines the steps followed in the development of database (Analysis Design Programming Testing Loading & Documentation).

10. Canadian Union Catalogue Task Group Final Report to the National Librarian of Canada. (Ottawa: National Library of Canada, 1976).
Description: A report with the objectives of equalizing opportunity for access to information, & making more cost-effective use of total Canadian library resources.

11. The Role of the Library in an Electronic Society. Lancaster, Wilfrid F. (Illinois: Graduate School of Library Science).
Description: Focuses on the role of the library within the context of technological developments in publishing & related facets of human communication.

12. Educational Technology: A Handbook of Standard Terminology and a Guide for Recording and Reporting Information About Educational Technology. (United States: U.S. Department of Health, Education, and Welfare/Education division).
Description: A handbook to help people in gathering, compiling, and interpreting data relating to the application of technology to instruction.

13. RICE: Resources in Computer Education, A Prospectus 2/5/82. (Oregon: 1982)
Description: Contents of this document are: a definition of RICE, patterns of user interaction with RICE, catagories of information, structure & definition, and pattern of implementation.

14. "A Clearinghouse for Educational Applications of Microcomputers; (AEDS-81 convention proceedings Minn. MN May

5-8/81). Holznagel, Donald C. (Oregon: Northwest Regional Educational Laboratory).
Description: This article describes MicroSIFT, a clearinghouse for microcomputer-based applications in education, established at the Northwest Regional Educational Laboratory. It is engaged in collecting, organizing and disseminating information about such applications. It has designed and field-tested an evaluation model for instructional applications based on the cooperation of a network of centers of educational computing.

15. "Softswap: The Evaluation and Dissemination of Non-commercial Teacher Created Software". Lathrop, Ann. (AEDS-81 Convention Proceedings Minn. May 5-8/81) pp.173-175.
Description: Describes 'Softswap' - an educational software library for microcomputers established in the Microcomputer Center of the San Mateo County Office of Education in Redwood City, California. It is a joint project of the County Office and Computer-Using Educators (C.U.E.). The non-commercial public domain programs contributed to the Center by teachers and other educators have been evaluated, edited and organized into the SOFTSWAP, a free exchange of instructional software for classroom use.

APPENDIX IV FIELD FORMATS

INTRODUCTION

This appendix gives examples of field formats used in descriptions of educational resources by various organizations and publications. The appendix has two categories:

A) Field formats for educational software

B) Field formats for other educational resources

A) FIELD FORMATS FOR EDUCATIONAL SOFTWARE

	NAME	PUBLISHER
1.	Catalogue De Didacticiels Quebecois - 1981	Gouvernement du Quebec Ministere de l'Education Direction generale des moyens d'enseignement
2.	Commodore Software Encyclopedia	681 Moore Road 300 Valley Forge Square King of Prussia PA 19406
3.	Conduit Computing Ideas for Education Reviewed and Tested Materials for Personal Commputers TRS-80, Apple, & PET.	100 Lindquist Center Univ. of Iowa P.O. Box 388 Iowa City, IA 52244 (319) 353-5789
4.	Creative Educational Services Lessonware Evaluation form Catalogue	386 St. Clements Ave. Toronto, Ontario M5N 1M1 (416) 488-9905
5.	Educational Software Directory - Apple II	Sterling Swift Publishing Co. P.O. Box 188 Manchaca, Texas 78652
6.	Florida Center for Instructional Computing	College of Education University of South Florida Tampa, Florida (813) 974-2100
7.	Instructor 1982 Computer Directory	Prentice Associates 46 St. John St. Boxton, MA 02130 (617) 524-6505
8.	International Microcomputer Software Directory (IMSD)	Imprint Software 420 South Howes Fort Collins, CO 80521 (303) 482-5574
9.	JEM Reference Manual Vol. 1	Discovery Park Univ. of Victoria P.O. Box 1700 Victoria, B.C.

		V8W 2Y2 (604) 477-7246
10.	Microphys Programs Educational Software Catalogue	Microphys Programs 2048 Ford St. Brooklyn. N.Y. 11229 (212) 646-0140
11.	PEMC Prov. of B.C. Prov. Educational Media Centre	7351 Elmbridge Way Richmond, B.C. V6X 1B8 (604) 278-4961
12.	Plato Courses 1980 Catalogue Control Data Education Co.	Control Data Corporation Vancouver-(604) 685-8585 Toronto-(416) 826-8640
13.	PST Vector Analysis	Don Whitewood 44 Wychwood Park Toronto, Ontario Canada M6G 2V5
14.	Queue Catalogue #2 Educational Software for: Apple II, PET, TRS-80	5 Chapel Hill Drive Fairfield, Connecticut 16432 (203) 372-6761
15.	Rice Format MicroSIFT	Computer Technology Program Northwest Regional Educational Laboratory 300 SW Sixth Ave. Portland, Oregon 97204
16.	School Microware A Directory of Educational Software	Dresden Associates P.O. Box 246 Dresden, Maine 04342
17.	Skarbek's Software Directory	11990 Dorsett Road Maryland Height MO 63043 (314) 567-3291
18.	The Apple Software Directory Volume Three Education Summer/Fall 81	Widl Video, Chicago 5245 W. Diversey Ave. Chicago, Illinois 60639 (312) 622-9606
19.	Vanlove's Apple II/III	Vital Information Inc.

Software Directory

350 Union Station
Kansas City, MO 64108
(913) 384-3860

20. The Journal of Courseware
Review Vol. 1 No. 1
P.O. Box 28426
San Jose, CA
95159

copyright: EPEC Evaluation
Centre, Foundation for
the Advancement of
Computer-aided Education
20863 Stevens Creek Blvd.
B-2, A-1, Cupertino, CA
94015

1. Catalogue De Didacticiels
Quebecois 1981

Description: This directory gives an overall view of software available in Quebec/summer 81. This collection is aimed at teachers and future users of microcomputers in teaching. The area of concentration was drill & practise, tutorial, simulation, and educational games. The three contributors to the directory are:

1) teachers
2) hobbyists
3) commercial vendors - (list of directories)

This is compiled by the Ministry of Education in Quebec, in an attempt to collect descriptions of public domain software.

2. Commodore Business Machines Inc.
Software Group

Description: This encyclopedia of software is a listing of most of the software available for use on the CBM/PET line of computers.

The format for software listings is product name, a description of the product as supplied by the manufacturer or vendor, hardware requirements (the equiment configuration required for the program to operate), vendor name, retail price & product code.

The directory is divided into 13 catagories: Business, word processing, utilities, engineering aids, personal aids, games, Vic 20, publications, firmware, hardware, Canada, Europe, Education.

The education division is subdivided into Administrative Aids & Courseware. Administrative Aids are useful to adminstrators and teachers in the school. Courseware is further divided into Math, Science, Verbal Skills and Social Studies. The directory ends with an alphabetical list of vendors, and an index for the encyclopedia.

3. Conduit: Computing Ideas for Education
Reviewed & Tested Materials for Personal Computers.

Description: Conduit has two catalogues:

1) Standard Basic & Fortran packages (non-machine specific)

2) Microcomputer packages (for Trs-80, Apple II, & PET 2001) of educational software

Conduit packages that are listed in this catalogue, provide instructors with information and materials needed to use the unit manuals for students, and recommendations for using the materials in the classroom and software. The programs are tested for performance and are written specifically for the following machines and require no modifications:

Apple II, Applesoft in ROM, DOS, 3.2.1, 48K, diskette
Radio Shack TRS-80, Model 1, level II Basic, DOS, 32K, diskette.
Commodore PET 2001, 8K OLD ROM & 16K NEW ROM, diskette or cassette.
(See: sample Conduit abstract next page)

4. Creative Educational Services
Lessonware Evaluation Form Catalogue

Description: The Catalogue Data sheet was developed by Gordon S. Wells, at Creative Educational Services, 386 St. Clements Ave. Toronto, Ontario; for the Ministry of Education.

The format was prepared as a guide for the evaluator, to outline and aid in the completion of each of the five parts of the evaluation form.

5. Educational Software Directory
Apple II Edition

Description: This directory contains lists of educational software organized by commercial and by non-commercial publishers. Both sections contain names and addresses, lists of programs available, descriptions of programs, memory required and price.

The appendix of the directory contains an index that is subdivided into these catagories: elementary school software, junior high software, secondary software, community software, college/university and continuing education software.

This directory would be informative for a teacher as some publishers are school publishers only and are designated as such by a star (*). These programs are designed for the classroom and usually include teachers guides. They have been listed according to these areas: computer literacy or awareness, computer assisted instruction (CAI), administrative and statistical packages.

6. Florida Center for Instructional Computing

Description: The Florida Educational Computing Project began in 1977. The project hired consultants to advise schools, examined state resources for teaching basic computing skills, explored the possibliity of establishing a computer guidance system, published software evalutions and sponsored computer literacy seminars.

The Florida Center for Instuctional Computing (FCIC) developed an indexing system for software. The following pages give examples of the codes used in their manual for indexing software by software company. Subject, Grade Level, Type, Model, Storage and Peripherals, and an sample of their software index data form.

7. Instructor: 1982 Computer Directory for Schools

Description: This directory includes lists of companies hardware, software, books and resources, periodicals & free materials for the K-12 educational computing community.

8. IMSD International Microcomputer Software Directory

Description: This directory contains 5000 programs, cross-referenced & indexed by subject, machine, operating system, vendor and price.

Programs are easily accessed through 3 different routes:

1: Specific Application: If the program you require is to run on any system, this section lists software by machine (make and model), then within general categories the names and ISPN's (International Standard Program Numbers) of compatible programs, gives a short description and price.

2: System: If the program you require is to run on any system, this section lists software cross referenced by specific subjects organized in 7 major categories; Commerce, Education, Home, Industry, Professions, Sciences, and Systems. Also gives ISPN's compatible systems and prices.

3: Software house: When cross-referencing from sections one and two, or if you wish to buy from a particular software house, this section lists software in ISPN order (thus in software house order) gives full description of program, features, method of distribution, special requirements and price.

9. JEM Reference Manual
Vol. I.

Description: The purpose of this manual is to provide educators with information and guidelines for locating, selecting, and purchasing commercially available courseware for the Apple II Microcomputer.

The manual contains the following sections:

Section I: an annotated courseware index
Section II: catalogue reproductions
Section III: a list of publishers & distributors
Section IV: courseware descriptions
Section V: an annotated list of computer books
Section VI: an annotated list of computer magazines and journals.
Section VII: an annotated list of compatible expansion options & accessories.

In the courseware index programs are listed as follows; DOS, language, cost, publisher and distributor, subject area, grade levels and descriptions are included.

10. Microphys Programs
Educational Software Catalogue

Description: This is a catalogue of computer programs which have been designed for use on the Commodore PET/CBM & the Apple II/Bell & Howell computers. Some of the programs have been converted for use on the Radio Shack TRS 80 Model I and Model III systems.

There are three types of programs in the Microphys Series:

1) Computer Assisted Instruction Programs
2) Individualized-Instruction Programs
3) Anagram Programs

11. PEMC
Province of B.C.
Prov. Educational Media Centre

Description: The following three forms:

1) Courseware Description
2) PEMC Materials Specifications Form
3) PEMC Catalogue Entry Form

are used for sifting and identifying educational software programs for suitability in schools. These forms are adapted from the MicroSIFT model, National Educational Regional Laboratory.

12. Plato Courses 1980 Catalogue
Control Data Education Company

Description: This catalogue describes the curricula, courses, and learning activities that are available on Control Data Plato.

Individual catalogue entries contain several sections:

1) Media
2) Estimated Average Time to Complete
3) Library
4) Demonstration Lesson Name
5) Plato File Name
6) Plato Router Name
7) Plato Instructor File
8) Plato Learning Management File
9) Projected Release of Final Edition

The catalogue is divided into areas of study by subject headings listed in alphabetical order. There is a subject index and an alphabetical index at the end of the catalogue.

13. PST Vecor Analysis

Description: This field format example is taken from a summary of a paper in production by Charm Schlezinger 388/2 Sheshet Hayamim St. Kiryat Shoma, Israel 10200. David Walker, Dorvanhill, 74 Victoria Crescent RD., Glascow, Scotland, G12 9JN. and Don Whitewood, 44 Wychwood Park, Toronto, Canada M6G 2V5. The original paper is entitled "A positive Step Towards International Microcomputer Software Evaluation," and includes such items as stqandard screens, classification (vector analysis), and cataloguing database standards.

14. Queue
Educational Software for Apple II, PET, TRS-80
Catalogue

Description: Queue is an order catalogue which contains a list of publishers, table of contents, description of software, instructional packages and a list of publications. The programs are grouped by computer, subject area and grade level. The fields used are: order #, program and description, publisher and price.

15. Rice Format
MicroSIFT

Description: The Rice Computer system is an information base, with related inquiry and update software, designed to provide information about the state of the art in the application of computers in schools to interested persons through on-line searches.

There are five categories (sub files) in which information is included:

1) Producers. 2) Software Packages. 3) Computer Literacy. 4) Inventory. 5) Project Register.

The following pages outline which fields are used when building and maintaining computer files for online access.

16. School MicroWare
A Directory of Educational Software

Description: School MicroWare is published four times a year.

School MicroWare is organized as follows: First, software descriptions in sequence by school department, subject and lowest grade level; second, summary listings of software for individual hardware systems, in the same sequence as the first section; third an alphabetical listing of software suppliers and their addresses, a School MicroWare evaluation form; and finally, a glossary of terms used.

Entries in the Software Descriptions section contain program name, department, subject, grade level range, program type.

17. Skarbeks Software Directory: Apple

Description: Skarbeks software directory was written as a source of information for Apple Software.

Fields

Title: Programs are listed in alphabetical order by title. There is also a subject index to help locate programs with misleading titles.

Published by: Denotes manufacturer, publisher, or distributor.

Memory: 16K, 32K, 48K, or if no memory is listed see local dealer.

Description: Descriptions are as per publisher information only.

Price: Prices are given on each program and are subject to change without notice.

18. The Apple Software Directory
Vol. III Education 4th Edition
Summer/Fall 81

Description: This directory includes names & addresses of 450 suppliers and covers a wide range of subjects.

The programs are arranged in content by topic headings, and are also arranged in alpahabetical order by program title. To find the source of a software program, each program has a 3 digit source code number which is found in the software source index at the front of the directory.

19. Vanlove's Apple II/III Software Directory

Description: Software is divided into main subject categories such as Business, Word Processing, etc. In front of each subject section is an index of that section. In some categories, there are two sections. Categories with 2 sections have the number 2 before the subject code, ex. 2CPM. Page numbers are listed beside a program and these refer to descriptions of the program. ex. AG-2. Vendors names are abbreviated and listed in full at the back of the directory.

20. The Journal of Courseware Review
Vol. 1 No. 1

Description: The Journal of Courseware Review found that in addition to the need for qualitative review of commercially available courseware, there was also a need for a systematic organization and identification of the growing numbers of educational programs.

Each review in the journal concludes with descriptive data useful to librarians, media specialists and teachers to facilitate the integration of courseware information into existing media collections or to establish separate software libraries.

The following two pages contain four examples of the fields and format used by the Journal to organize catalogue and source information.

MATIERE Mathématiques

TITRE Nombres décimaux

MACHINE Pet

TYPE Tutoriel

SUPPORT Disquette

FRANCAIS ⓧ ANGLAIS ○

LANGAGE DE PROGRAMMATION Basic

CLIENTELE Sixième jusqu'à secondaire I et II

COMMENTAIRE Opérations quatre niveaux de difficultés

PERSONNE RESSOURCE René Beauchamp - Commission scolaire des Mille-Iles

ADRESSE 213, boul. Ste-Rose Laval

TEL (514) 625-6951

MATIERE Mathématiques

TITRE Nombres entiers négatifs

MACHINE Pet

TYPE Tutoriel et exercices

SUPPORT Disquette

FRANCAIS ⓧ ANGLAIS ○

LANGAGE DE PROGRAMMATION Basic

CLIENTELE Sixième jusqu'à secondaire I et II

COMMENTAIRE Opérations (100 minutes)

PERSONNE RESSOURCE René Beauchamp - Commission scolaire des Mille-Iles

ADRESSE 213, boul. Ste-Rose Laval

TEL (514) 625-6951

2. 2.

MATH & SCIENCE

ZAP

A multiplication game for two people that provides practice of facts for numbers 2 through 6. Graphics are used. During the game, players cannot get out of the program unless they turn the computer off or until one of them scores 100 points. Intermediate.

HARDWARE REQUIREMENTS: 8K PET (both old and new ROMs).

Microcomputers in Education **$9.95 tape** **CC2**
$7.50 disk (min. of 10 programs)

STARS

Guess a number between 0 and 100, which has been randomly selected by the computer. As you get closer, more and more stars appear. Some graphics are used. The stop is disabled. Primary, Intermediate.

HARDWARE REQUIREMENTS: 8K PET (both old and new ROMs).

Microcomputers in Education **$9.95 tape** **CC6**
$7.50 disk (min. of 10 programs)

MATH DRILL

Choose 10 addition, subtraction, multiplication, division, or mixed operation problems, with range of 0-5, 0-10, or −10 to +10. Keeps track of time used for the 10 problems, and gives summary of correct and incorrect answers, at end of run.

HARDWARE REQUIREMENTS: 8K PET (both old and new ROMs)

Microcomputers in Education **$9.95 tape** **CC10**
$7.50 disk (min. of 10 programs)

Sample CONDUIT Abstract

Title	➤	**SAMPLE CONDUIT ABSTRACT**
Catalog number	➤	**Catalog #: SAM235A** **Topic: instructions**
Courses where applicable	➤	**Suggested course: Learning to Use the CONDUIT Catalog**
Author, publishers, & date of publication	➤	**Author: Molly Hepler, CONDUIT, 1980.**
Statement of purpose and content of the materials.	➤	**Description: The purpose of this unit is to help students understand...**
What you get when you order the package. Always includes at least one copy of each manual and the software.	➤	**Package: Five copies of Student Guide (30 pages), one copy of Instructor's Guide (50 pages), and software on diskette**
The package price includes at least one copy of each manual. Additional copies are for students, the library, etc. Extra copies of the software are available only if you order the full package.	➤	**Price: Package, $40.00; Add'l Instructor, $3.00; Add'l Student, $2.50; Add'l copy of software, $10.00**

the costs of administering the surveys so that students can see the financial implications of their choices.

Package: *Instructor's Guide* and software on diskette

Price: Package, $65.00; Add'l Instructor, $3.00; Add'l copy of software, $10.00

Statistics

Exploratory Data Analysis

Catalog #: STA324A

Topics: data analysis, exploratory data analysis

Suggested courses: Data Analysis, Applied Statistics, Research Methods

Authors: Paul Velleman (Cornell University) and David Hoaglin (Abt Associates), Duxbury Press, Boston, 1981

Description: These programs accompany the authors' book *Applications, Basics, and Computing of Exploratory Data Analysis*. The programs analyze data according to EDA techniques and would be useful in any course in which EDA is taught. Methods included in the package are stem and leaf displays, letter-value displays, boxplots, x-y plots, resistant lines, data smoothing, coded table displays, median polish, and rootograms. The book presents selected basic techniques of exploratory data analysis, illustrates their application to real data, and explains the accompanying program from this software package.

new

Package: One copy of book, *Applications, Basics, and Computing of Exploratory Data Analysis* and software on diskette

Price: Package, $150.00; Add'l Student, $15.00. (Multiple copies of this text for class use should be purchased directly from the publishers to obtain bookstore discounts.); Add'l copy of software, $10.00

Descriptive Statistics

Catalog #: STA114A

Topics: tabular analysis, graphic analysis, measures of central tendency, measures of dispersion

Suggested courses: Descriptive Statistics, Introductory Statistics

Author: Harrison D. Weed, Jr. (Project COMPUTe), COMPress, Wentworth, New Hampshire, 1978.

Description: This package provides supplementary materials to standard textbooks for precalculus statistics and probability courses. The student manual discusses several methods of describing and summarizing raw data. Students use the programs and data sets to practice applying these methods. Concepts discussed in the manual include data types, frequency distributions and their graphical representations, measures of location, and measures of dispersion.

new

Package: *User's Guide* (56 pages) and software on diskette

Price: Package, $75.00; Add'l Student, $5.95; Add'l copy of software, $10.00

TRS-80

Model I, 32K, Level II BASIC, diskette

Biology

COEXIST—Population Dynamics

Catalog #: BIO118T

Topic: population dynamics

Suggested course: Introductory Biology

Author: P.J. Murphy, Chelsea Science Simulation Project, Chelsea College, London, 1975

Description: This unit simulates two biological situations. In the first, up to three populations are modeled to grow independently on identical, limited food resources. The student can then investigate organisms competing only with members of their own species. The second simulates two populations in competition with each other for the same limited resources. In each situation the student controls a number of parameters such as initial population, number of offspring, generation times, initial and saturation points, and inhibiting factors which influence the outcome of species competition.

Package: Six copies of *Students' Notes* (15 pages), one copy of *Teachers' Guide* (15 pages), and software on diskette

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

COMPETE—Plant Competition

Catalog #: BIO182T

Topic: plant competition

Suggested course: Introductory Biology

Author: M.E. Leveridge, Chelsea Science Simulation Project, Chelsea College, London, 1975

Description: This simulation enables students to plan and carry out investigations of interactions between flowering plants without the long delay usually associated with growth experiments. The unit includes investigations with both real and simulated plants, and other relevant data in the form of graphs, tables and descriptions. The seven investigations deal with effects of crowding on plant growth, measurement growth, simulated growth in a monoculture, interaction between clover varieties, simulated growth in a mixture, interaction below the ground, and direct plant interaction.

Package: Six copies of *Students' Notes* (15 pages), one copy of *Teachers' Guide* (11 pages), and software on diskette

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

Ecological Modeling

Catalog #: BIO083T

Topics: ecology, ecosystem, population growth

Suggested courses: Introductory Ecology, General Biology

Authors: Wm. Reiners, Wm. Glanz, and S. Cornish (Project COMPUTe), CONDUIT, 1973

Description: This package introduces students to techniques for modeling ecological systems and processes on the computer. By controlling certain parameters, such as initial population size, growth rate, time length of the simulation, and others, students test hypotheses and predict results about ecosystems. Population growth is first considered as unlimited growth of a single species, using an analytical solution for the differential equations and then difference equations for incrementing growth. Additional factors introduced are environmental carrying capacity, random environmental factors, and competitive interaction between species. Each of these concepts builds toward the last program, a simulation of the growth and interactions of trophic levels within an arctic tundra ecosystem.

Package: Three copies of *User's Manual* (76 pages) and software on diskette

Price: Package, $65.00; Add'l User's, $4.00; Add'l copy of software, $10.00

ENZKIN—Enzyme Kinetics

Catalog #: BIO181T

Topic: enzyme kinetics

Suggested course: Biochemistry

Author: M.T. Heydemann, Chelsea Science Simulation Project, Chelsea College, London, 1976

Description: This unit permits students to obtain realistic results using a computer program to simulate enzyme-catalyzed reactions. The introduction to the *Students' Notes* describes some of the features of enzyme-catalyzed reactions. In later sections, students are asked to plot progress curves and calculate initial velocities of reactions. Six enzymes with different properties are simulated.

Package: Six copies of *Students' Notes* (15 pages), one copy of *Teachers' Guide* (15 pages), and software on diskette

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

LESSONWARE EVALUATION FORM

Date ______________

CATALOGUE

PROGRAM NAME: ______________________ **VERSION:** ______________________

AUTHOR: ______________________

PUBLISHER: ______________________

ADDRESS: ______________________

CITY: ______________________ **SUBJECT AREA:** ______________________

COST: ______________________ **TOPIC:** ______________________

GRADE LEVEL (circle): K 1 2 3 4 5 6 7 8 9 10 11 12 13 N/A

INTENDED USER:

☐ TEACHER ☐ STUDENT ☐ PROGRAMMER ☐ OTHER (specify) ______________

SYSTEMS REQUIREMENTS

COMPUTER

☐ APPLE ☐ ATARI ☐ CEM ☐ COMMODORE ☐ RADIO SHACK ☐ OTHER (Specify) __________

Model: ______________

Required memory: ☐ 8K ☐ 16K ☐ 32K ☐ 48K ☐ 64K

PERIPHERALS REQUIRED

☐ Disk Drive ☐ 2 Disk Drives ☐ Cassette Player ☐ Paddles

☐ B/W Monitor ☐ Colour Monitior ☐ Light Pen ☐ TV Receiver

☐ Printer (specify model) ______________________

☐ Card Reader (specify model) ______________________

☐ Plotter (specify model) ______________________

☐ Other (specify) ______________________

SOFTWARE REQUIRED

☒ Language (specify version) ______________________

☐ DOS (specify version) ______________________

☐ Other (specify) ______________________

DRAFT VERSION 1.0

TECHNICAL EVALUATION

DOCUMENTATION

1. Is documentation provided with the program? ☐ YES ☐ NO

2. Does the documentation include:

a. suggested grade/ability level .... ☐ YES ☐ NO
b. instructional objectives .... ☐ YES ☐ NO
c. prerequisite activities .... ☐ YES ☐ NO
d. placement/diagnostic material .... ☐ YES ☐ NO
e. sample program run .... ☐ YES ☐ NO
f. program operating instructions .... ☐ YES ☐ NO
g. teacher's guide .... ☐ YES ☐ NO
h. student worksheets .... ☐ YES ☐ NO
i. followup activities .... ☐ YES ☐ NO
j. other (specify) ____
____

THE CATALOGUE DATA

Each section of the catalogue data sheet is outlined below with an explanation of exactly how it should be completed.

DATE:	Insert the date the evaluation is being completed in the following form: day/month/year (ie. 06/01/82).
PROGRAM NAME:	Insert the name of the package being evaluated exactly as listed on the package.
VERSION:	Insert the version number which in many cases will be found on the program cassette or disk. If no version is listed use the date of the program copyright. This will be a year such as 1981.
AUTHOR:	Insert the name of the author if one is indicated in the material. In some cases this will not be available in which case this item should be left blank.
PUBLISHER:	Insert the name of the publisher or if no publisher is listed in the material the distributor of the package should be listed.
ADDRESS:	Insert the address of the firm identified as the publisher.
CITY:	Insert the city of the firm identified as the publisher.
SUBJECT AREA:	Insert the subject area that the package relates to. If the package is a utility for use by the teacher, 'utility' should be indicated. As well, headings such as guidance, administration, library and communications should be used where applicable.
COST:	Insert the regular single quantity educational price of the package as supplied by the publisher.
TOPIC:	Identify the topic of the program. Where more than one topic is identified, indicate the main topics that are covered by the program.
GRADE LEVEL:	Circle the appropriate grade level(s) as indicated by the package's documentation or advertising. Note that you are not passing judgement on this information but are merely recording it. If no grade level is suggested by the publisher leave this section blank. If the package does not relate to a particular grade level (ie. a communications package) circle 'N/A'.
INTENDED USER:	Circle the appropriate user category or if the package is intended for another group insert this information opposite 'other'.

COMPUTER:	Put a check mark opposite the name of the computer for which the package is designed. If it is designed for a computer other than one of those that are indicated, circle 'other' and specify the make.
MODEL:	Indicate the model of the computer for which the package is designed. If more than one model is indicated by the publisher they should all be listed.
REQUIRED MEMORY:	Put a check mark opposite the minimal required memory as indicated by the publisher.
PERIPHERALS REQUIRED:	Check off any of the peripherals that are required to operate the program. Note that if colour is used in the program a colour monitor should be indicated. As well, if a printer, card reader or plotter is indicated the model should be specified. Any other peripherals that are required should be indicated by checking off 'other' and specifying both the equipment and the model that is needed.
SOFTWARE REQUIRED:	Check off each requirement from the following.
LANGUAGE:	State the computer language that is required to operate the program (ie. Basic or Pascal). Also, indicate the version that is required (ie. BASIC 2.0).
D.O.S.:	Indicate if a Disk Operating System is required with a check and specify the version (ie. 3.21 or 3.3).
OTHER:	If any other software beyond that which is included in this package is required it should be indicated along with the version number on this line.

Social Studies - Volume 2 (Senior High)
Teacher Utilities - Volume 1
Aestheometry - Volume 1
Elementary - Volume 5 (Language Arts)
MICAS - Volume I
CAM
Elementary - Volume 6
Special Needs - Volume 1 (Spelling)

MECC APPLE DEMONSTRATION DISKETTE

A sampling of the different kinds of applications available on the MECC diskettes; drill and practice, tutorial, simulation, problem solving, and worksheet generation. Samples from music, science, social studies, industrial arts, reading and mathematics are included.

ELEMENTARY — VOL. 1 (MATHEMATICS)

BAGELS

A game of logic. Guess the number with clues.

CHANGE

Provides drill in making change. Given a purchase price and amount paid, the student must make correct change.

HURKLE

Teaches the coordinate system. Students have to find the hidden Hurkel.

METRIC ESTIMATE

Timed drill on estimating the lengths of line segments in centimeters and millimeters.

METRIC LENGTH

Drill and practice on converting from one unit to another in the metric system.

METRIC 21

Metric blackjack. The user becomes skilled in approximating metric lengths.

NUMBER

A game of logic in which the user tries to guess the computer's number. The computer gives clues.

ROUND

Drill and practice on rounding numbers to the nearest ten, hundred, thousand, etc.

Apple Computer, Inc.

10260 Bandley Drive
Cupertino, CA 95014
408/996-1010

EDUCATION SERIES I — THE SHELL GAMES

A series of shells in which teachers or parents can create their own quizzes. The diskette comes already set-up with a series of "fun" quizzes in three forms: multiple choice, matching, and true/false. Simply by following the manual, with no programming knowledge, teachers can substitute their own quiz material into any of these formats. Price $29.95 (Integer, 32K).

EDUCATION SERIES II — ELEMENTARY MY DEAR APPLE

Teaching aid for home or classroom, includes four educational games for children 12 years and up. Lemonade is a simulation of running a lemonade stand, including changes in the weather and fluctuations in the cost of sugar. Darts teaches fractions and fraction estimation by "throwing" darts at a numberline. Supermath is a drill and practice program for basic math facts. Don't Fall is a variation on the game "hangman" for word recognition and spelling. It includes directions allowing parents and teachers to apply special words for a particular age group or subject. Price $29.95 (Applesoft and Integer, 48K).

► APPLE MUSIC THEORY

Music fundamentals developed for Apple by the Minnesota Educational Computing Consortium (MECC). Complete drill and practice exercises in aural intervals, counting, enharmonics, key signatures, naming notes, note types, visual intervals, music terms, rhythm, scales, sevenths, triads, and whole and half-step intervals. Includes two copies of the Music Theory diskette and an instruction manual. Price $50.00 (Dos 3.3).

► APPLE PILOT

A powerful, easy to use system designed to support courseware development for CAI. If you are already familiar with the PILOT language, you will have no trouble with Apple PILOT, as it is based on earlier PILOT implementations with some significant extensions.

A high level, easy to use language, PILOT was designed for use by educators, trainers, and courseware developers, and has been in use since 1968 as a language for creating CAI. In fact, PILOT is the most widespread CAI language available today.

MANUAL

1.	ACORN Software Products, Inc.	ASP
2.	Activity Resources Inc	ARI
3.	Addison-Wesley Publishing Co	AWP
4.	Advanced Graphics	AG
5.	Apple-Cations	APC
6.	Apple Computer Inc	API
7.	Atari Inc	AT
8.	Automated Simulations	ATS
9.	Avant-Garde Creations	AGC
10.	Basics and Beyond Inc	BBI
11.	Bell & Howell	BH
12.	Benchwork Computing Services	BCS
13.	Bluebird's Computer Software	BLS
14.	Borg-Warner Educational	BWE
15.	The Bottom Shelf	BS
16.	The Brain Box	BB
17.	CAI	CAI
18.	California Software	CAS
19.	Charles Mann & Associates	CMA
20.	Comm Data Systems	CDS
21.	ComPress	CP
22.	Compumax, Inc	COM
23.	Computer Curriculum Corporation	CCC
24.	Computer Information Exchange	CIE
25.	Cook's Computer Company	COC
26.	Courseware Magazine	CWM
27.	Creative Computing	CC
28.	Creative Software	CS
29.	Duxbury Systems, Inc	DSI
30.	DYNACOMP, Inc	DYN
31.	Education Programs	EDP
32.	Educational Activities, Inc	EAI
33.	Educational Courseware	EDC
34.	Educational Services Mgt. Corp	ESM
35.	Educational Software Midwest	EDM
36.	Educational Software Prof., LTD.	ESP
37.	Edu-Soft Steketee Educational Software	ESE
38.	Edutek Corp	EDU
39.	Edu-Ware Services Inc	EWS
40.	Entelek	ENT
41.	Gentech Corporation	GC
42.	Hartley Software	HS
43.	Hayden Book Company	HBC
44.	H & E Computronics, Inc	HEC
45.	Houghton Mifflin Co	HMC
46.	Infor. Unlimited Software, Inc.	IUS
47.	Instant Software	IS
48.	Instru. Development Systems	IDS
49.	Interpretive Education	IED
50.	J. L. Hammett Company, Inc	JHC
51.	K-12 Micromedia	KMC
52.	Krell Software	KS
53.	Learning Tools, Inc	LTI
54.	Level IV Products, Inc	LPI
55.	McGraw-Hill	MCH
56.	MECC Publications	MEP
57.	Mad Hatter Software	MHS
58.	Math Software	MS
59.	Med Systems Software	MSS
60.	MicroGnome	MG
61.	MicroLearningware	MLW
62.	Microphys Programs,	MIP
63.	Microsoft Consumer Products	MCP
64.	Milliken Publishing Co	MPC
65.	Milton Bradley Co	MBC
66.	Minnesota Software, Inc	MSI
67.	Monument Computer	MOC
68.	MTS Enterprises	MTS
69.	MUSE Software	MSE
70.	National Software Marketing	NSM
71.	People's Software	PS
72.	Personal Software	PES
73.	Powersoft	PWS
74.	Program Design Inc	PDI
75.	Programma International	PRI
76.	Programs for Learning	PFL
77.	Quality Education Design	QED
78.	Random House	RH
79.	Right-On Programs	ROP
80.	Science, Research Associates	SRA
81.	Scott, Foresman & Co	SFC
82.	Secondary Mathematics	SEM
83.	Simulations Publications	SIP
84.	Simutex	SIM
85.	Software Exchange	SOE
86.	Software House, Inc	SHI
87.	Solartek	SOL

88.	Sterling Swift Publishing Co.	SSP
89.	Taylor	TAY
90.	Teaching Tools: Microcomputer Services	TTM
91.	T.H.E.S.I.S.	THE
92.	3 R Software	3RS
93.	TimeShare Corp.	TSC
94.	Transnet Corp.	TRC
95.	TYC Software	TYC
96.	Tycom Associates	TYA
97.	Unicom	UNI

6.

6.

	SUBJECT	CODE
1.	Algebra	ALG
2.	Anatomy	ANA
3.	Arithmetic	ARI
4.	Art	ART
5.	Biology	BIO
6.	Business Education	BED
7.	Chemistry	CHM
8.	Dancing	DAN
9.	Ecology	ECO
10.	Economics	ECN
11.	Financial	FIN
12.	Geography	GEG
13.	Geometry	GEO
14.	Grammar	GRM
15.	History	HIS
16.	Language	LAN
17.	Mathematics	MTH
18.	Music	MUS
19.	Physical Education	PE
20.	Physics	PHY
21.	Reading	RED
22.	Science	SCI
23.	Social Studies	SOC
24.	Spelling	SPL
25.	Statistics	STA
26.	Vocational	VOC

	LEVEL	CODE
1.	Pre-School	K
2.	Primary (K-3)	P
3.	Intermediate (4-6)	I
4.	Junior High	J
5.	High School	H
6.	College	C

	TYPE	CODE
1.	Drill & Practice	DRI
2.	Tutorial (Concepts)	TUT
3.	Computer Assisted Testing	CAT
4.	No. 1 and No. 3 Above	CAI
5.	Simulation	SIM
6.	Perceptual	PER
7.	Games	GAM
8.	Computer Managed Instruction	CMI
9.	Authoring Language	AL

	MODEL	CODE
1.	TRS 80 Model 1	RS1
2.	TRS 80 Model 11	RS2
3.	TRS 80 Model 111	RS3
4.	TRS 80 Color	RSC
5.	Apple 2	AP2
6.	Apple 3	AP3
7.	ATARI 400	AT4
8.	ATARI 800	AT8
9.	PET	PET
10.	IBM	IBM
11.	MONROE	MON

6.

6.

STORAGE

~~MODEL~~	CODE
1. Disk Only	D
2. Cassette	C
3. Both	B
4. Hard Disks	H

Peripherals	CODE
1. Printer	P
2. Joy Stick	J
3. Light Pen	L
4. Voice Synthesizer	V
5. Cassettes	C
6. Disk (extra)	D

NOTES

COST.............Approximate - based on one (1) disk drive.
SUBJECT..........Main and broad subject area first.
MEMORY...........48

YES OR NO

Florida User................FCIC knows where it is used.
National User...............FCIC knows where it is used.
Review......................FCIC has reviews in FCIC.
Preview.....................FCIC has the software in Library with access numbers.

COMMENTS

Length of program, number of drives required, number of lessons, contents, unusual features, no value judgements.

- SAMPLE -

FLORIDA CENTER FOR INSTRUCTIONAL COMPUTING (FCIC)
SOFTWARE INDEX DATA FORM

Date Indexed 1 2 0 4 8 1 12/4/81

Updated ☐☐☐☐☐☐

Copyright Year 7 9 1979

Source H B C Page 1 Manual
Item 43 - Hayden Book Co.

Cost ☐ ☐ 1 1 $10.79 (Based on one disk drive)

Author E N G E L ☐ B I L L ☐

Title M I C R O T Y P I N G

Subject B E D T Y P ☐☐☐

Level I C

Type D R I See PAGE 3 Manual

Model R S 1 P E T A P 2 ☐☐☐ ☐☐☐ PAGE 4

Memory ☐ 1 6

Storage B

Peripherals ☐ PAGE 5

Florida User ☐

National User ☐

Review Y PAGE 6

Preview (Access No.) 1 2 3 4

COMMENTS

TEACHES TOUCH
TYPING GIVES APPROX-
IMATE WORDS PER MIN.

Indexed by C.W.E.

7.

Product Name: Spelling Drill

Grade Level: 1-8

Description (50 words or less): Uses game format with positive reinforcement for correct spelling. Teacher can change vocabulary. Displays list of misspelled words at end.

Skills Taught: Spelling

Equipment requirements: 48K Apple II with single disk drive — 3.3 DOS; 48K TRS-80 Model III with single disk.

Support Materials Included (describe): Six-page documentation manual provides instructions for loading, saving, changing vocabulary and suggested classroom exercises.

Unique Educational Features: Appropriate for remedial work; can change vocabulary to fit curriculum.

Manufacturer: Spelling Software, Inc.

Price: $9.99

Ordering Information Contact: DIS Distributors, Box 123, Happenstance, MA 02134

Full Details of Literally Thousands of Programs from Major Software Houses throughout the World.

SECTION ONE ►

Access here if the program you require is to run on a specific system

357 NORTHSTAR

5.22 PROFESSIONALS/CPA's

Professional Tax Program **8090-650**
Program chooses the most advantageous tax method that complies with regulations. Automatic printing of tax returns. $690.00

Charges and Time Program **5672-500**
A time and cost record-keeping program for accountants, lawyers, and other professionals. $795.00

Incomplete Records Accounting **8038-200**
Designed for practicing accountants to produce final accounts from incomplete records. $485.00

Lists software by machine (make and model), then within general categories the names and ISPN's of compatible programs. Gives a short description and price.

MACHINE

SUBJECT

LISTED IN PRICE ORDER

UNIQUE ISPN FOR EASY CROSS-REFERENCING

SECTION TWO ►

Access here if the program you require is to run on any system

1.39 COMMERCIAL/INFORMATION RETRIEVAL SYSTEMS

INFORMATION RETRIEVAL SYSTEMS

Mailing List and Membership **8010-180**
Pet, TRS II $25.00

Disk Sort Merge Utility **2202-380**
App I, App II + , CP/M £14.00

Data Manager **7704-466**
Atari, TRS I, M Basic $40.00 CDN

Appointment Schedule and Calendar **5672-050**
N/Star, CP/M $95.00

Lists software cross-referenced by specific subjects organized in seven major categories: Commerce, Education, Home, Industry, Professions, Sciences, and Systems. Also gives ISPN, compatible systems, prices.

CATEGORY

SUBJECT

COMPATIBLE SYSTEMS

SECTION THREE ►

Access here when cross-referencing from sections One and Two, or if you wish to buy your program from a particular Software House

MICRO MIKES INC. **5672**
905 South Buchanan, Amarillo, Texas 79101. (806) 372-3633
Amarillo, Texas 79101
Terms: Money Order/Check, prepaid software post paid.
Agents: Available from local computer stores: Europe - MMM Computer Services, PO 2892, Matnen Severdijk 31, Rotterdam 010 370342

Appointment Schedule and Calendar **5672-050**
Up to twenty persons or groups can keep an organized appointment schedule. Also, monthly summaries or detailed daily appointments. This program draws a calendar for any month on the screen or printer. Users may transfer a message to one of the other twenty persons or groups. A monthly summary of appointments or a detailed daily appointment listing can be displayed. Features a reminder of standing appointments, holidays, anniversaries, client/spouse birthdays, etc. BaZic.
(1) 09.80 (2) Partial (3) Y (5) Partial $30 (6) Y $25 (7) Hard Disk if using CP/M (8) N/Star, N/Star Dos, CP/M (9) 32 (10) 5 (11) $95.00

Charges and Time Program **5672-500**
A time and cost record-keeping program for accountants, lawyers, and other professionals.
Time and charges program designed for business that charges clients based on employee time and out-of-pocket expenses. Keeps totals on contract-to-date expenses and maintains accounts receivable on contracts. When bills are finalized, contract data moved from work-in-progress to realization. Input error corrections possible. Much more! Program is set up to serve 40 employees and 10 different service charge codes. BaZic.

Lists software in ISPN order (thus in Software House order) gives full description of program, features, method of distribution, special requirements and price.

SOFTWARE HOUSE

SOFTWARE HOUSE CODE

LISTED IN ISPN ORDER

BASIC INFORMATION:

1. Date of Release
2. Warranty?
3. Sole Vendor?
4. Part of Package?
5. Source Code
6. Updates?
7. Special Configurations?
8. System/s (Machine, Chip, O/S)
9. Memory
10. Distribution Medium
11. Price

APPENDIX: PROGRAM INDEX

9. 9.

jem
research
Joint Educational
Management Research

DISK TITLE:	TIES SCIENCE-BIOLOGY/MISC.
PROGRAM TITLE:	PHOSYN
TYPE:	SIMULATION
SUBJECT AREA:	CHEMISTRY/BIOLOGY
GRADE LEVEL:	JUNIOR/SENIOR HIGH SCHOOL
LANGUAGE:	APPLESOFT
PERIPHERAL:	NO
MEMORY REQUIREMENT:	32K
D.O.S.:	3.3
DISTRIBUTOR:	TOTAL INFORMATION EDUCATIONAL SYSTEMS (TIES)
APPROXIMATE PRICE:	$30.00 U.S. (PER SUBJECT DISK)

DESCRIPTION: This interactive program allows the user to investigate changes in the rate of photosynthesis by varying the carbon dioxide concentration and light intensity.

Instructions are included in the program. The user may investigate the effect of light or carbon dioxide on the rate of photosynthesis. The entered values for light intensity must be between 0 and 30. while the entered values for carbon must be between 0 and .30. In either case the results indicating the rate of photosynthesis may be printed in either chart or graph form, or both.

[illegible]

These programs require a 16K environment and the Commodore 2040 disk drive.

PC901 QUESLO - permits the creation of source files used to generate individualized exams and homework assignments.

PC902 QUEGEN - accesses source files prepared by QUESLO and generates and grades the exams and homework assignments.

⁂

FAMILY-ORIENTED RECREATIONAL PROGRAMS

1.* The **WORD GAME** programs require only 8K of storage. Players try to fill in missing letters in a randomly chosen title or phrase and earn points according to the graphic display on a "Wheel of Fortune." The scores of each of the players are recorded, 1000 points being required to win the game. When ordering, specify:

PC375 SONG TITLES
PC376 FAMOUS PLACES
PC377 ENTERTAINERS
PC378 STATESMEN
PC379 SCIENTISTS
PC380 SPORTS FIGURES

Each of these programs retails for $15.

2. A realistic draw **POKER** game has been developed which pits the skills of various players against one another and against the Computer House. Graphic displays depict each hand; players bet, draw cards, and bet again. The House is programmed to make moves in accordance with the hand it has been dealt and the nature of the betting which has taken place. The computer evaluates each hand, both before and after cards have been drawn, rearranges the cards in each hand appropriately, and clearly displays a summary of each game. Total standings of the House and players are recorded and displayed after each game.

POKER is designed for use on the PET with a minimum of 16K of storage. When ordering, specify:

PC385 POKER This program retails for $15.

3. A family **BINGO** program has been developed which permits from 1 to 20 players to enjoy the excitement of this computer-controlled and managed game. The computer displays the randomly selected numbers and evaluates the cards in the game after each call is made in order to determine if a winning card exists. The computer can also display the status of any given card during the course of a game. A set of 20 Bingo cards is included with the program; players may also create their own cards and enter these into the computer. The program permits the following types of games:

a. *any bingo* (horizontal, vertical, or diagonal) b. *frame*
c. *full card* d. *letter L* e. *letter T* f. *letter X* g. *letter H*

BINGO is designed for use on the PET with a minimum of 16K of storage. When ordering, specify:

PC390 BINGO This program retails for $15.

4.* Cryptogram fans have responded favorably to the **CRYPTO** program which is designed to create cryptograms from various lines of text which are entered by the user. The encoded cryptogram is then displayed along with its unique *code number.* To decode this cryptogram, **CRYPTO** is run from line 9000.

CRYPTO will permit user no. 1 to create an encoded message which he may mail or transmit to user no. 2, assuming both have access to the program. The *code number* will permit user no. 2 to have his computer decipher the message should he encounter difficulty.

CRYPTO is designed for use on the PET with a minimum of 8K of storage. When ordering, specify:

PC350 CRYPTO This program retails for $15.

Only those programs marked with an asterisk (*) are available on cassette for use with the Apple II and the TRS80 Model I and Model III computers.

Generates a series of 5 questions dealing with a confined gas which undergoes an isobaric compression during which a quantity of heat is removed.

PC15 TRANSVERSE STANDING WAVES
Generates a series of 4 questions dealing with the study of the standing wave pattern established in a wire which is fastened at both ends.

PC16 LONGITUDINAL STANDING WAVES
Generates a series of 4 questions dealing with the longitudinal wave pattern established in open and closed organ pipes.

PC17 * MIRRORS AND LENSES
Generates a series of 5 questions dealing with the image-forming properties of convex and concave mirrors and lenses.

PC18 * REFRACTION OF LIGHT
Generates a series of 3 questions dealing with the behavior of light rays striking a planar interface between two optical media.

PC19 * SERIES CIRCUIT ANALYSIS
Generates a series of 10 questions dealing with the analysis of a series circuit consisting of three resistors and a battery. The concepts of resistance, potential difference, and power are thus reviewed.

PC20 * PARALLEL CIRCUIT ANALYSIS I
Generates a series of 10 questions dealing with the analysis of a parallel circuit consisting of three resistors and a battery. The concepts of resistance, potential difference, and power are thus reviewed.

PC20A PARALLEL CIRCUIT ANALYSIS II
Generates a series of 6 questions dealing with the analysis of a parallel circuit consisting of three resistors and a battery. The concepts of resistance, potential difference, and Ohm's Law are thus reviewed.

PC21 * SERIES/PARALLEL CIRCUIT ANALYSIS
Generates a series of 6 questions dealing with the analysis of a circuit in which a single resistor is in series with a parallel combination of two resistors.

PC22 * FARADAY'S LAW
Generates a series of questions dealing with the analysis of an electrolytic solution.

PC23 * GRAM-MOLECULAR MASS
Randomly synthesizes inorganic compounds whose gram-molecular masses are to be determined. The writing of chemical formulas is also thus reviewed.

PC24 * THE MOLE CONCEPT
Generates a series of questions which deals with the mole concept and the writing of chemical formulas.

PC25 * THE MOLARITY CONCEPT
Generates a series of 3 questions dealing with the concept of molarity; the mole concept is also reviewed.

PC26 * THE NORMALITY CONCEPT
Generates a series of questions dealing with the concepts of gram-molecular mass, gram-equivalent mass, and normality.

Only those programs marked with an asterisk (*) are available on cassette for use with the TRS80 Model I and Model III computers.

11. PEMC

COURSEWARE DESCRIPTION:

Package Title ______________________ Version __________

Producer ______________ Address ______________ Cost __________

Distributor (if different from producer) ______________________

Subject Area ______________ Grade/Ability Level ______________

Specific Topic ______________ Dewey Decimal __________

Sears Subject Headings ______________________

Medium of Transfer:

- ___Tape Cassette
- ___ROM Cartridge
- ___5" Flex. Disk
- ___8" Flex. Disk
- ___DOS

Required Hardware:

(See Hardware page 10)
List Options

____
____
____
____
____
____
____

Required Software:

(See page 11)
List requirements

____
____
____
____
____
____
____

Components:

- ___Complete packag
- ___Single programm
- ___Integrated programme series component
- ___Other __________

____
____
____

DEVELOPER'S RATIONALE

Instructional Purpose:

- ___Remediation
- ___Standard Instruction
- ___Enrichment

Instructional Techniques:

- ___Drill & Practice
- ___Tutorial
- ___Informational Ret.
- ___Game
- ___Other ______________
- ___Simulation
- ___Problem Solv.
- ___Learning Mgmt.
- ___Utility

Programme Listing & Alteration:

- ___Can teacher alter?
- ___can back-up be sent?
- ___Can teacher copy?

Documentation Available: (Circle all that are available in the computer programme (p) or in the supplementary materials (s)).

- P S Suggested grade/ability level(s)
- P S Prerequisite skills or activities
- P S Programme operating instructions
- P S Instructional Objectives
- P S Sample programme output
- P S Pre-test
- P S Post-test
- P S Student Worksheets
- P S Student instruct.
- P S Other __________
- P S Teacher's information
- P S Resource/reference info.
- P S Follow-up activities
- P S Relationship to standard textbooks

11.

PEMC MATERIALS SPECIFICATIONS FORM

11.

INTERNAL REFERENCE NUMBER

CATALOGUE NUMBER ✓	TITLE NUMBER	CROSS REFERENCE 1.	CROSS REFERENCE 2.	PART NUMBER	SERIES	AVAILABLE OTHER MEDIUM
TITLE ✓						
SORT	MEDIUM ✓	DISTRIBUTOR ✓			DATE RECEIVED	PRODUCTION YEAR
COPIES	PARTS	COLOUR	BLACK & WHITE	RUNNING TIME	FILM	VIDEO
DESCRIPTION ✓						
GRADE LEVEL	LANGUAGE		PRICE	PAGE	CURRICULUM	
SPECIAL 1. ✓						
SUBJECTS ✓						
LIBRARY CONGRESS NUMBER		DEWEY NUMBER		✓		
SPECIAL 2						

DATE	PREVIEWED FOR CURRICULUM AREA(S)

NOTES

RECOMMENDATION ☐ NOT TO BE CONSIDERED FOR PURCHASE

☐ TO BE CONSIDERED FOR PURCHASE AS: ☐ PRESCRIBED

☐ SUPPLEMENTAL

PREVIEWER'S INITIAL

PEMC CATALOGUE ENTRY FORM

10 PITCH

CATALOGUE NO
TITLE NO
ENTRY TYPE
CROSS REFERENCE #1
CROSS REFERENCE #2

TITLE

DEPT #
MED
PRODUCER
YEAR
COPIES
PARTS

DESCRIPTION

GRADE LEVEL
LANG
PRICE
PAGE
CURRICULUM
SPECIAL 1

SUBJECTS
LC #

DEWEY #
SPECIAL 2

ANNOTATION

INSTRUCTIONS

1. Use a 10 pitch typewriter only with a carbon ribbon and an OCR-B font (IBM 1167210)
2. Type only in spaces provided, making sure paper is square, so lines are not skewed
3. Make sure type element is clean and that all characters impressions are black and unbroken.
6. Use the "1" key when you wish a one; use of the "el" key for a one is not permitted and will cause your file to be rejected.
7. Notes may be handwritten in red felt tip pen as red is invisible to the OCR scanner
8. If in doubt, please contact us. Caution and care is important — if your copy is re-

LANGUAGES (ENGLISH)

Word Power: English Vocabulary

AUTHOR
Richard Scanlan
University of Illinois

INTENDED AUDIENCE
High school or college level English language students

GOALS
Understand the derivations of English words

Build general vocabulary skills

ABSTRACT
This series of twenty-five learning activities deals with the derivation and structure of English words. The learning activities are similarly structured; each has four sets of exercises and a self-test. The list of prefixes, suffixes, and roots upon which the activity is based is given in the beginning of the lesson and is available on request, except when the test is being taken. When the student successfully completes a learning activity, he or she is then allowed to choose another. There are four word-power tests at the end of the series, with one chance per question. Scores are tabulated at the end of each test.

ESTIMATED AVERAGE TIME TO COMPLETE
40 hours

LIBRARY B

PLATO FILE NAMES
0voc1-0voc25;
0voct1-0voct4

Computer-Managed Instruction

AUTHOR
Control Data Corporation

INTENDED AUDIENCE
Students may be persons in industrial, military or educational settings who wish to use computer-managed instruction (CMI). Varying levels of experience in education and training are assumed, including no experience. A college education, or equivalent, is recommended; minimum educational level is high school. The "CREATE Fundamentals" course is a prerequisite.

GOALS
Discuss the testing, record keeping, and prescription generating components of CMI systems in general and, specifically, the Control Data CMI system

Be able to develop a module of instruction using the Control Data CMI system

MEDIA
PLATO terminal (85 percent), text, filmstrips, audiotapes

ABSTRACT
In this course, which is part of the *CREATE Curriculum*, the student is introduced to a computerized method of testing, record keeping and decision making that assists administrative, classroom and individual learner management. He or she examines how CMI can solve the management problems of individualized instruction; distinguishes CMI from other applications of computers in instruction; looks at the role of CMI in testing, record keeping and prescription generation; is introduced to the features of the Control Data CMI system; and finds out how to prepare instruction using CMI.

MAJOR TOPICS
High Quality Instruction

Basics of CMI Systems

Testing, Record Keeping and Prescription Generation in CMI

Developing CMI Curriculums

The Control Data CMI System

ESTIMATED AVERAGE TIME TO COMPLETE
8 hours

LIBRARY E

PLATO LEARNING MANAGEMENT FILE
0cate

13.

13.

CATALOGUE OF SOFTWARE FOR SCIENCE

```
-------------------------------------------------------------------------------
SUBJECT HEADINGS:      /   /                  PROGRAM TITLE:
CROSS REFERENCES:                             SERIES:
GRADE LEVEL:              (EARLY CHILD,PRIM,JUNIOR,INTER,SECONDARY,COLLEGE,TMR)
CHARACTERISTICS P:     S:    T:               YEAR OF STD:
CATEGORY:                 (DRILL,GAME,SIMUL.,TUTOR,UTIL.,OTHER)

AUTHOR:                                       SOURCE:
REVISER:                                      DATE (YYMM):
STATUS:                   (COPYRIGHT,LICENCE,PUBLIC)

COMPUTER:                 (APPLE,ATARI,CEM,PET,TRS,VIC,OTHER,(SPECIFY))
ROM/DOS REQUIRED:                             MEMORY SIZE:
FORMAT:       DISK     TAPE                   DISK ID:
REQUIRES:
                          (CHIP,DISK,MANUAL,PRINTER,SOUND,WORKSHEET,OTHER)
OFFICE USE:

ANNOTATION OR COMMENTS - (UP TO 108 CHARACTERS):

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Apple II - Integer Basic

Order #	Program & Description	Publisher	Price
PD9A	CODE BREAKER Ages 10 to adult 3 scrambled message games of increasing difficulty that build basic word handling skills needed for good writing. First game scrambles letters within the words in the message: next 2 games scramble letters & also word order. The last game gives the hardest messages. Messages are made up by the computer from an extensive word list.	Program Design, Inc.	$ 14.95
PD10A	MINICROSSWOARD All ages 4 programs that consist of 2 minicrosswords and 2 codeword games. Crossword programs invent their own crossword puzzles-dozens of completely different puzzles are possible-and score how well you do each puzzle. When used in conjunction with the codeword programs, which are word-guessing games, the course provides a vocabulary and spelling development system.	Program Design, Inc.	$ 14.95
	IQ BUILDER SERIES Junior high up A group of 4 courses that prepare a high school student for the College Boards or adult for aptitude tests. See also PD14, Mathematics section.	Program Design, Inc.	
PD11A	VOCABULARY BUILDER 1: BEGINNING 11 programs include a set of graded vocabulary questions on synonyms and antonyms (the most common type of vocabulary question on an IQ test). The last lesson is a test on vocabulary. Total of 400 questions, 2000 words in course.	Program Design, Inc.	$ 14.95
PD12A	VOCABULARY BUILDER 2: ADVANCED 11 programs like those in Vocabulary 1, but using a more advanced word list.	Program Design, Inc.	$ 14.95
PD13A	ANALOGIES Contains 6 programs that teach what an analogy is and what the common types are, provide a method for analyzing analogies and provide practice in handling all types of analogies. Final lesson is an analogies test.	Program Design, Inc.	$ 14.95

RICE Subfile Content Matrix
January 28, 1982

Para Label	Field Name	Prod	Soft	Inv	Proj	Lit	V = Value D = Display O
		Subfiles					
AN	Accession Number	x	x	x	x	x	
RT	Resource Type	x	x	x	x	x	
TI	Title		x		x		
T1	Description		x		x		
PD	Producer Name	x	x	x	x	x	
YR	Year of Publication		x				V
CI	Address	x	x		x	x	
C1	Phone Number	x	x		x	x	
C2	Contact Person	x	x		x	x	
C3	Cost		x		x	x	
C4	Additional Availability		x				
HT	Hardware Type	x	x	x	x		
NU	Number of Units			x			V
SR	System Req.: Hardware		x		x		
R1	Software		x		x		
R2	Medium of Transfer		x		x		
DE	ERIC Descriptors	x	x		x	x	
ID	Identifiers	x	x		x	x	
GL	Grade Levels	x	x		x	x	
MI	Mode of Inst: Purposes		x		x		
M1	Techniques		x		x		
II	Inst. Info.: Objectives		x				D
I1	Prerequisites		x				D
I2	Student Time		x				D
AB	Abstract	x	x		x		
EV	Evaluation: Strengths		x				D
V1	Weaknesses		x				D
V2	Site/Date		x				D
V3	Other Data		x				D
ES	Evaluation Summary		x				
ST	State	x		x	x		
SP	School Pop.: Student			x			V
P1	Faculty			x			V
OI	Objective, Item					x	
TC	Textbook Correlation					x	
CR	Correct Response					x	
NT	Notes	x	x	x	x	x	D

SOFTWARE

Accession Num ..AN-______

Resource Type ..RT-b

Title ..TI-

Description ..TI-

Producer Name ..PD-

Year Published ..YR-

Address ..C1-

Phone ..C1-___/___-____

Person ..C2-

Cost ..C3-

Addit. Avail. ..C4-

Hardware Type ..HT-

System Req.:

Hardware ..SR-

Software ..R1-

Medium ..R2-

ERIC Descr. ..DE-

Identifiers ..ID-

Grade Level (circle approp. #s) ..GL-Pre-1, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, Post Sec.

Modes:

Purposes ..M1-

Techniques ..M1-

Objectives ..I1-

Prerequisites ..I1-

13. RICE Subfile Content Matrix
January 28, 1982

	Para Label	Field Name	Subfiles: Prod	Soft	Inv	Proj	Lit	V = Value D = Display Onl
1.	AN	Accession Number	x	x	x	x	x	
2.	RT	Resource Type	x	x	x	x	x	
3.	TI	Title		x		x		
	T1	Description		x		x		
4.	PD	Producer Name	x	x	x	x	x	
5.	YR	Year of Publication		x				V
6.	CI	Address	x	x		x	x	
	C1	Phone Number	x	x		x	x	
	C2	Contact Person	x	x		x	x	
	C3	Cost		x		x		
	C4	Additional Availability		x				
7.	HT	Hardware Type	x	x	x	x		
8.	NU	Number of Units			x			V
9.	SR	System Req.: Hardware		x		x		
	R1	Software		x		x		
	R2	Medium of Transfer		x		x		
0.	DE	ERIC Descriptors	x	x		x	x	
1.	ID	Identifiers	x	x		x	x	
2.	GL	Grade Levels	x	x		x	x	
3.	MI	Mode of Inst: Purposes		x		x		
	M1	Techniques		x		x		
4.	II	Inst. Info.: Objectives		x				D
	I1	Prerequisites		x				D
	I2	Student Time		x				D
5.	AB	Abstract	x	x		x		
6.	EV	Evaluation: Strengths		x				D
	V1	Weaknesses		x				D
	V2	Site/Date		x				D
	V3	Other Data		x				D
7.	ES	Evaluation Summary		x				
8.	ST	State	x		x	x		
9.	SP	School Pop.: Student			x			V
	P1	Faculty			x			V
0.	OI	Objective, Item					x	
1.	TC	Textbook Correlation					x	
2.	CR	Correct Response					x	
.	NT	Notes	x	x	x	x	x	D

SOFTWARE

Accession Num ..AN-

Resource Type ..RT-b

Title ..TI-

Description ..TI-

Producer Name ..PD-

Year Published ..YR-

Address ..CI-

Phone ..CI- / -

Person ..C2-

Cost ..C3-

Addit. Avail. ..C4-

Hardware Type ..HT-

System Req.:

Hardware ..SR-

Software ..R1-

Medium ..R2-

ERIC Descr. ..DE-

Identifiers ..ID-

Grade Level (circle approp. #s) ..GL-Pre-1, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, Post Sec.

Modes:

Purposes ..M1-

Techniques ..M1-

Objectives ..I1-

Prerequisites ..I1-

RICE Data Definitions

PRODUCERS FORM

1. AN Accession Number - A unique 6-character number assigned to every record as it is entered in the RICE file, independent of sub-file.

2. RT Resource Type - An identifier of sub-files: a. Producer; b. Software; c. Inventory; d. Projects; e. Computer Literacy

3. PD Organization Name - The name of a producer (publisher, developer, marketer), an organization which is the prime source of software.

4. CI Contact Information - This contains the address of the organization named in the PD field. In the Software and Producer sub-files, this is the central marketing information address.

    C1 Phone Number - The telephone number of the address in CI.

    C2 Contact Person - The name of the contact person, if known, at the address and phone given in CI and C1.

5. HT Hardware Type - This field contains only general hardware type identification, such as TRS-80 III or Apple II. In the Producer sub-file, it contains the types for which the organization is producing software.

6. DE Descriptors - Standard ERIC descriptors of the producer's products.

7. ID Identifiers - Special descriptors other than ERIC, such as Sears Subject Heading, Dewey Decimal, and any terms designed for greater specificity than in the ERIC Thesaurus, which may add to the description of products or organizations.

8. GL Grade Level - One or more identifiers from the following set:
   Pre-1, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, Postsecondary
   If a package is intended for a range (such as grades 4-6), every grade in the range is specified (4, 5, 6). In the Producers sub-file this identifies the levels for which the organization produces courseware.

9. AB Abstract - A general narrative description. For Producers, it could describe the nature of their activities such as contract only, develop and retail, develop only, etc.

10. ST State - The full name of the state, province or territory where the producer is located.

11. NT Notes - Contains a variety of miscellaneous information, available only to the NWREL staff, such as reminders, special contact names, evaluation process status, etc.

RICE Data Entry Form

PRODUCERS

Accession Num ..AN-

Resource Type ..RT-a

Producer Name ..PD-

Address ..CI-

Phone ..C1-

Person ..C2-

Hardware Type ..HT-

ERIC Descr. ..DE-

Identifiers ..ID-

Grade Level ..GL-Pre-1, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, Post Sec
(circle approp. #s)

Abstract ..AB-

State ..ST-

Notes ..NT-

SOFTWARE DESCRIPTIONS

01029

BUSINESS - ACCT'G/BOOK'G

BUSNS PKG 3 ACCT'G/BOOK'G GRADES 9- 12 COMP SUPPORT	Full disk gen ledger syst including chart of accts,jrnl entry,reports** TRS-80 LANG: BASIC SOURCE: Micro Learningware, $24.95

COMPREHENSIVE

ANALYSYS1,2 GRADES 1- 12 COMP SUPPORT	Scor'g,grad'g,statist analyses of mult choice tests; keeps recds-disk PET LANG: BASIC SOURCE: Microphys, $40
GRADES MNGT GRADES 1- 12 TEACHER AID	Records & averages grades; graphs distrib, produces final grades TRS-80 LANG: BASIC SOURCE: The Teaching Asst, $24.95
SCHOOLMASTR GRADES 1- 12 TEACHER AID	Scores tests, analyzes, records, and reports scores TRS-80 LANG: BASIC SOURCE: Alternate Source, $24.95
STATISTICS GRADES 7- 12 COMP SUPPORT	Provides comprehensive capability for statis analysis of data- disk APPLE LANG: BASIC SOURCE: Edu-Ware Services, $9.95

COMPREHENSIVE - BASIC SKILLS

PRESCHL FUN BASIC SKILLS GRADES K- 2 TUTORIAL	Teaches color, shape, num recog,u/l case ltrs, direct'ns; no read'g req ATARI LANG: BASIC SOURCE: T.H.E.S.I.S., $15
WORDSEARCH BASIC SKILLS GRADES 2- 8 EDUC'L GAME	Prints wordsearch puzzle w/ ans key us'g wrds given;3 levels-disk,prntr APPLE LANG: BASIC SOURCE: Hartley Software, $14.95

COMPUTER SCIENCE/LITERACY - COMPUTER PROG

BASIC TUTR1 COMPUTER PROG GRADES 5- 12 TUTORIAL	Fund's of program'g APPLE in BASIC, incl'g keybd,PRINT,strngs,INPUT-dsk APPLE LANG: BASIC SOURCE: Educat'l Coursewe, $24
BASIC TUTR2 COMPUTER PROG GRADES 7- 12 TUTORIAL	BASIC program'g of APPLE: GOSUB,hi-/low-res grafix,plot'g funct'ns-dsk APPLE LANG: BASIC SOURCE: Educat'l Coursewe, $24
BASIC TUTR4 COMPUTER PROG GRADES 7- 12 TUTORIAL	BASIC program'g on APPLE: compos'g, saving, playing back music- on disk APPLE LANG: BASIC SOURCE: Educat'l Coursewe, $24

COMPUTER SCIENCE/LITERACY - COMPUTER PROG (CONT)

04127

BASIC TUTR7 COMPUTER PROG GRADES 7- 12 TUTORIAL	Intermed program'g: shape tables, Ap'soft pointrs,files,mach lang-dsk APPLE LANG: BASIC SOURCE: Educat'l Coursewe, $24
BASIC TUTR3 COMPUTER PROG GRADES 7- 12 TUTORIAL	BASIC program'g on APPLE: intro to disk data files & ASCII codes- disk APPLE LANG: BASIC SOURCE: Educat'l Coursewe, $24
BASIC TUTR5 COMPUTER PROG GRADES 7- 12 TUTORIAL	BASIC program'g on APPLE: graphics, data tables,sort'g,random nums-disk APPLE LANG: BASIC SOURCE: Educat'l Coursewe, $24
BASIC TUTR6 COMPUTER PROG GRADES 7- 12 TUTORIAL	Intermed prog'g on APPLE: primes, string handl'g,prog size,grafix-dsk APPLE LANG: BASIC SOURCE: Educat'l Coursewe, $24

ENGLISH - BASIC SKILLS

ALPHA KEY BASIC SKILLS GRADES K- 1 TUTORIAL	Introduces, drills on upper and lower case alphabets TRS-80 LANG: BASIC SOURCE: Radio Shack, $29.95
CRIT READ'G BASIC SKILLS GRADES 2- 10 TUTORIAL	Compl read'g tutor'l syst: pre/post tests,lesns,quiz's,mgt syst-8 disks APPLE LANG: BASIC SOURCE: Borg-Warner Ed Sys, $750
MOTHER GOOS BASIC SKILLS GRADES 2- 6 SKILLS PRACT	Pract recall words,spell'gs in Mother Goose rhymes; color graphx-dsk APPLE LANG: BASIC SOURCE: George Earl, $24.95
READG COMPR BASIC SKILLS GRADES 3- 9 SKILLS PRACT	User picks different word out of 4; builds analyt'l skills for reading ATARI LANG: BASIC SOURCE: Program Design Inc, $14.95
SPEL'G-DRIL BASIC SKILLS GRADES 3- 12 ROTE DRILL	User enters words; prog flashes wds to drill spel'g;adjustbl displ time TRS-80 LANG: BASIC SOURCE: Basics & Beyond, $19.95*
SPELLING BASIC SKILLS GRADES 3- 12 SKILLS PRACT	Builds file(s) your words; flashes words, student pract's spelling TRS-80 LANG: BASIC SOURCE: Micro Learningware, $7.95
MINICROSSWD BASIC SKILLS GRADES 3- 8 EDUC'L GAME	4 progs create x-word puzzles, play codeword games; build vocab,spel'ng ATARI LANG: BASIC SOURCE: Program Design Inc, $14.95
CRYPTO BASIC SKILLS GRADES 4- 10 EDUC'L GAME	Creates cryptogram; players decode from letter, punctuation clues TRS-80 PET APPLE LANG: BASIC SOURCE: Educat'l Activit's, $11.95
MAKE OUTLIN BASIC SKILLS GRADES 4- 9 SKILLS PRACT	Stud't finishes outline for article given by computer; performanc reprt PET LANG: BASIC SOURCE: MICRO-ED, $7.95

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* Price of package including this program & others.

** Uses extra hardware; see supplier's literature.

PROG NAME	GRADES	DESCRIPTION	ID NO.
		* * * COMPREHENSIVE * * *	
STATISTICS	7 - 12	Provides comprehensive capability for statis analysis of data- disk	03007
		* * * COMPREHENSIVE - BASIC SKILLS * * *	
WORDSEARCH	2 - 8	Prints wordsearch puzzle w/ ans key us'g wrds given;3 levels-disk,prntr	03012
		* * * COMPUTER SCIENCE/LITERACY - COMPUTER PROG * * *	
BASIC TUTR1	5 - 12	Fund's of program'g APPLE in BASIC, incl'g keybd,PRINT,strngs,INPUT-dsk	04125
BASIC TUTR2	7 - 12	BASIC program'g of APPLE: GOSUB,hi/low-res grafix,plot'g funct'ns-dsk	04127
BASIC TUTR4	7 - 12	BASIC program'g on APPLE: compos'g, saving, playing back music- on disk	04127
BASIC TUTR7	7 - 12	Intermed program'g: shape tables, Ap'soft pointrs,files,mach lang-dsk	04127
BASIC TUTR3	7 - 12	BASIC program'g on APPLE: intro to disk data files & ASCII codes- disk	04127
BASIC TUTR5	7 - 12	BASIC program'g on APPLE: graphics, data tables,sort'g,random nums-disk	04127
BASIC TUTR6	7 - 12	Intermed prog'g on APPLE: primes, string handl'g,prog size,grafix-dsk	04127
		* * * ENGLISH - BASIC SKILLS * * *	
CRIT READ'G	2 - 10	Compl read'g tutor'l syst: pre/post tests,lesns,quiz's,mgt syst-8 disks	06012
MOTHER GOOS	2 - 6	Pract recall words,spell'gs in Mother Goose rhymes; color graphx-dsk	06012
CRYPTO	4 - 10	Creates cryptogram; players decode from letter, punctuation clues	06014
STORY-TELLR	4 - 12	Describes, gives pract w/ parts of speech;reinforces w/ humorous tales	06014
COMPU-READ	4 - 12	Drills on high speed recognition of chars, words, and sentences-disk	06014
		* * * ENGLISH - LITERATURE * * *	
RDGS IN LIT	7 - 12	Pract recall'g words,spell'gs in 27 famous passages;color grahix- dsk	06157
SYLLOG LOGC	9 - 12	Ident'g categ'l propos'n types;Venn diagr'g;creat'g categ'l syllogs-dsk	06159
		* * * FINE ARTS - MUSIC * * *	
ARNOLD	1 - 12	Tone recog, melodic memory skills; solfeggio/scale nums;begin to adv	07201
NAME TUNE	1 - 9	Aural ident of scale degrees; solfeggio/scale nums; familiar tunes	07201
RHYTHM DICT	6 - 12	Aural rhythms, rhythm notation;game format; auto adjust to abil level	07206
MUS SYMBOLS	7 - 12	Identification, recall of musical symbols	07207
ITALIAN	7 - 12	Identif, spelling & recall of Italian musical terms; comprehensive	07207
SIR WILLIAM	7 - 12	Ident of wrong note,4-voice chordal context;extern compar rt vs wrong	07207
		* * * FOREIGN LANGUAGE - SPANISH * * *	
PRAC ESPANL	7 - 12	Drills on 1)verbs, most tenses; 2) vocab keyable to all texts- on disk	08277
SP HANGMAN	7 - 12	Pract Spanish in Hangman game format; 1600 words, 450 sentences- disk	08277
		* * * MATHEMATICS - BASIC SKILLS * * *	
TABLES 1-12	1 - 4	Drill on arith facts, tables 1-12; all 4 operat'ns; grafix "rewards"	13011
PRESCR MATH	1 - 4	Teachr specifies arith lesn for 100 stud'ts;prog drills, recds/reprts	13011
MULT&DIVISN	2 - 8	Pract on whole no. mult'n, divis'n; grafix "rewards"; mult diffic levls	13012
ADDN&SUBTRN	2 - 6	Pract on whole num add'n, subtr'n; grafix "rewards", mult diffic levls	13012
FRAC TAC TO	4 - 10	Players try to get 3 in row by capturing grid pt determ'd by frac-pkg	13014
EQUIV FRACS	4 - 10	Covers equiv fract'ns by explanatn, student experiment & practice (pkg)	13014

TITLE: ARTILLERY DUEL
PUBLISHED BY: P.S.E.
Duel between two bases with mountain terraine. High Resolution Graphics. 16K.
PRICE: 10.00

TITLE: THE ARTIST'S BRUSH
PUBLISHED BY: CDS-P
MEMORY: 16K
Trade your palette for the paddles and paint your creation.
PRICE: TAPE or DISK, 19.95

TITLE: ASM/65 EDITOR ASSEMBLER
PUBLISHED BY: OSS

ASM/65 is a powerful, 2 pass disk-based assembler for the Apple II Computer System. It is a compatible subset of the FORTRAN cross-assemblers which are available for the 6500 family of micro-processors. ASM/65 features many powerful capabilities, which are under direct control of the user. The PIE Text Editor co-resides with the ASM/65 Assembler to from a comprehensive development tool for the assembler language programmer. Following are some of the features available in the ASM/65 Editor Assembler:

PIE Text Editor Command Repetoire
Disk Based System
Decimal, Hexadecimal, Octal, & Binary Constants
ASCII Literal Constants
One to Six character long symbols
Location counter addressing"*"
Addition & Subtraction Operators in Expressions
High-Byte Selection Operator
Low-Byte Selection Operator
Source statements of the form: [label] [opcode] [operand] [comment]
56 valid addressing modes
Equate Directive
BYTE Directive to initialize memory locations
WORD Directive to initialize 16-bit words
PAGE Directive to control source listing
SKIP Directive to control source listing
OPT Directive to set select options
LINK Directive to chain multiple text files
Comments
Source listing with object code and source statements
Sorted symbol table listing
PRICE: DISK, 69.95

18. 18.

Elementary Mathematics

CONTAINS MATH GAMES, MATH DRILLS, AND PROGRAMS TO ASSIST IN THE TEACHING OF MATH SKILLS THRU THE ELEMENTARY GRADES. ALSO SEE ADVANCED MATHEMATICS SECTION FOR PROGRAMS THAT MAY ALSO BE APPLICABLE TO YOUR REQUIREMENTS.

ADDITION FUN 201
Practice your addition facts and make the screen "go crazy". If you make a mistake, the program will help you.
Tape 15.00
Disk 19.50

ADRILL 412
Same as drill with the addition of signed numbers. See: Math I

ALGEBRA 154
Language: Integer Basic and Machine Language
Description: School tested enjoyable algebra programs, using missing words, this interactive program starts the student learning algebra on the high school level.
Includes Cassette and loading instructions.
Cassette with 2 lessons 9.95

APPLE ARRAY 412
A multiplication program that visually presents the problem in an array in an apple barrel. See: Math I

APPLE BARREL 412
An estimation program that is aimed at instilling the feel of quantity or amount. See: Math I

AREA OF TRIANGLES 411
Drill and practice in computing areas of triangles.

ARITHMETIC RACING 285
A game that students can play as often as they wish because they will be developing basic arithmetic skills. A game of timed arithmetic practice with the versatility to be appropriate for students from the early grades through the early high school years. It can even challenge the speed and accuracy of college math majors and arithmatic whiz kids even though it is designed for students who are learning arithmetic skills and students who can benefit from skills practice.
The player first selects either addition, subtraction, multiplication, or division and then specifies the largest number that he wants the computer to give him. He also selects a speed level from 1 to 5. The computer then assigns a point value to each problem based on these selections. A twenty-five point bonus is added to the score for answering each of the ten questions correctly. 32K Disk 15.00

BAGELS 269
A number guessing and problem solving game.
See: Math Games II

BAGELS 335
The number logic game. The three digit number you must discover makes for a fast game and better learning of the logic required for a good solution. 16K Integer 9.95

BAGELS 411
Number guessing games; each using different clues to narrow down the answer.

BAGEL 2 411
Number guessing games; each using different clues to narrow down the answer.

BASIC ARITHMETIC SKILLS 201
Beginning students can learn addition, subtraction, multiplication, and division facts easily. Remedial students can have fun reviewing basic arithmetic facts. A tic-tac-toe game with a simulated opponent rewards a player for completing a drill/tutorial.
OTHER FEATURES:

- A manual is included with each order.
- Up to ten students per disk can be registered.
- Disks are reusable -- a teacher can delete student records and register new students.
- Addition, subtraction, multiplication, and division operations are presented with 20 levels of skills and reviews.
- Students progress at their own pace with respect to each operation and independently of each other — progress is automatic and based upon student performance.
- Verbal, visual, and auditory reinforcements are used with all four operations.
- If a student makes a mistake during a tutorial, a model of the problem is shown the student so he/she can compute the correct answer.
- Teachers can manually change a student's level of difficulty or or the length of a student's tutorial.
- Teachers can get progress reports on demand for any student — hard copies available if they have printer.
- Grade range 1st - 6th grade.

Manual & 1 Disk 89.50
Manual & 3 Disks 199.50

BASIC MATH SKILL GAMES 417
Do your students have problems with addition, subtraction, multiplication or divisions? If your answer is yes, BASIC MATH SKILL GAMES is designed for your classroom use. The programs present drill and practice at three different levels of problem difficulty. Certain programs are designed to increase speed while others develop accuracy. All programs combine graphics with gaming techniques that encourage students to drill and practice. Twelve programs plus a teacher's guide. Elementary—Jr. high
DISK 94.95

BATNUM 411
Battle of the Numbers Game.

BOXES 412
A basic addition and subtraction facts game which first asks that the number of objects in each group be defined and then asks the answer to the problem. See: Math I

THE CALCULATOR 239
Adds, subtracts, multiplies and divides very large numbers using numeric string data. The Calculator subroutine (using twenty place accuracy) is written in Assembler code, and runs much faster than an equivalent BASIC subroutine.
See: Programming Aids 3.3

CAR JUMP 150
Make your stunt car jump the ramps. Each correct answer will increase the number of buses your car must jump over. These problems involve calculating the areas of different geometric figures.

CIRCLE AREA 411
Derives the formula for circle area by "coil and cut" method.

COLOR MATH 011
16K

TITLE: ASSISTANT PRINCIPAL
PUBLISHED BY: MONUMENT COMPUTER SERVICE

ASSISTANT PRINCIPAL is a complete administrative package for high school and junior high schools. The package provides total control of class rosters, student master records, student schedules, teacher assignments, and grade reporting.

The system allows the school administrator to design student input documents, enter students onto the system, schedule their classes, print class rosters, accept grades and test scores, print report cards, print file folder labels and prepare student master records. The system automatically prints ranked class lists and records attendance information.

The system requires two disk drives and Applesoft in ROM. The system is provided on seven diskettes with a two volume operating manual for $500.00. The operating manuals are available separately at $50.00.

TITLE: ATTENDANCE RECORDS FOR TEACHERS
PUBLISHED BY: COMPUTER HOUSE DIV.

Record and review any teachers name and absence information. Generates seven reports, including tabulations of the number of absences by weekday, by date, by reason for each month, and by length of absence. Also printed out, is a listing of teachers names and their absence information. Prints a notification report for an individual teacher when the maximum number of absences are exceeded for certain reasons.

PRICE: $250.00

TITLE: ATTENDANCE FOR STUDENTS
PUBLISHED BY: COMPUTER HOUSE DIV.

Record & review all students by number. Reports showing: name, address, phone, grade, school, times absent by reason and date. Prints dismissal notice when maximum number of absences are exceeded.

PRICE: $145.00

TITLE: THE CLASS SCHEDULING SYSTEM
PUBLISHED BY: CHARLES MANN & ASSOCIATES

The Class Scheduling System prepares all input forms, reports expected class conflicts, and prepares final master school rosters and individual student schedules. The system is designed to optionally interface with CMA's The Grading Systems Programs (a grade reporting and report card printing system) and The Counsellor's Program (a student record and file organization system.)

The scheduling system allows the school to define required courses, if any, and prepare individual student input forms for upcoming semesters, quarters or trimesters. Students, with counsellor or homeroom assistance can prepare the student request forms including optional and alternative course desires. The counsellors can assign priorities for required courses, prerequisites or for units required for graduation this period.

The system will examine the student requests and proposed course offerings to prepare reports on class loads and potential conflicts. The system has several established methods of prioritization to allow for the best overall matching of needs and available courses and sections. Once an acceptable solution is found, the system will schedule courses, study halls, and lunch periods to create the master school class rosters and individual student schedules. The magnetic output can optionally be used in CMA's grading system and

The Journal of Courseware Review

Cataloging Information

Dewey Decimal Number:	511
ERIC Descriptor:	Mathematics– Computer programs
Subject Heading (Sears):	Mathematics

Source Information

Program	*Guinness World Records Fractions, Decimals and Percent*
Source	SVE/Society For Visual Education, Inc. Department GF-2 1345 Diversey Parkway Chicago, IL 60614
Equipment	32K Apple II or Apple II Plus Disk Drive Color Monitor or Television with RF Modulator
Package	Two Diskettes with Teacher Information (D74-SA) Available for TRS-80
Suggested Retail Price	$65.00 Diskettes $45.00 Cassettes Available from Dealer or SVE

Cataloging Information

Dewey Decimal Number:	001.64
ERIC Descriptor:	Programming Languages
Subject Heading (Sears):	1. BASIC (Computer program languages) 2. Programming Languages (Electronic computers)

Source Information

Program	*Hand-Holding BASIC*
Source	Special Delivery Software (SDS) 10260 Bandley Drive Cupertino, CA 95014
Equipment	48K Apple II or Apple II Plus Disk Drive, Video Monitor or Television with RF Modulator
Package	Two Diskettes and User Guide (C2E0001)
Suggested Retail Price	$100.00 Available from Local Dealer or SDS

20.

20·

The Journal of Courseware Review

Cataloging Information

Dewey Decimal Number:	500
ERIC Descriptor:	Science Activities
Subject Heading (Sears):	Science-Computer programs

Source Information

Program	*Science Volume 3*
Source	MECC Publications 2520 Broadway Drive St. Paul, MN 55113
Equipment	32K Apple II or Apple II Plus Disk Drive, Color Video Monitor or Television with RF Modulator
Package	One Diskette and Support Booklet
Suggested Retail Price	$20.00 Program Diskette $ 5.65 Support Booklet Available from MECC

Cataloging Information

Dewey Decimal Number:	511
ERIC Descriptor:	Mathematics-Computer programs
Subject Heading (Sears)	Mathematics

Source Information

Program	*Revised Milliken Math Sequences*
Source	Milliken Publishing Company 1100 Research Blvd. St. Louis, MO 63132
Equipment	48K Apple II or Apple II Plus Disk Drive, Video Monitor or Television with RF Modulator
Package	Twelve Diskettes and Teacher's Guide. Abbreviated Versions for TRS-80 and PET
Suggested Retail Price	$450.00 Available from Local Dealer

FIELD FORMATS FOR OTHER EDUCATIONAL RESOURCES

B) FIELD FORMATS FOR OTHER EDUCATIONAL RESOURCES

	NAME	PUBLISHER
1.	National Film Board of Canada Programming Guide	International Distribution Division 125 Houde Ville St. Laurent, Quebec H4N 2J3 (514) 333-4500
2.	NICSEM	National Information Center for Special Education Materials University of Southern California Univ. Park. RAN Los Angeles, CA 90007
3.	OECA The Ontario Educational Communications Authority	P.O. Box 200 Station Q. Toronto, Ontario M4T 2T1 (416) 484-2600
4.	ONTERIS Ontario Education Resources Information System	Information Centre Research Branch Ministries of Education and Colleges & Universities 13th Floor Mowat Block Queen's Park Toronto, Ontario M7A 1L2

1. National Film Board of Canada
   Programming Guide

Description: The National Film Board of Canada Programming Guide is arranged alphabetically and contains an alphabetical title index as well as an extensive PRECIS index (Preserved Context Index System). The Precis system describes content, and allows one to search for films under familiar terms and to find related subject areas.

Included on the following pages are:

1) an example of a film described in the guide.
2) an example of the PRECIS Index.
3) Canadian audio-visual Product Information/Distribution system.

2. NICSEM

Description: The following two forms are examples of a BRS- (BRS-Bibliographic Retrieval Service) / Nicsem citation and a list of fields used in the database which focuses on both print & non-print educational materials suitable for use with the handicapped.

Nicsem offers detailed information in a variety of formats on media and materials resources.

3. OECA

Description: The materials catalogued by OECA are file indexed by OECA's Basic Program Number (BPN). The standards for the file were developed using the Canadian Marc format for audio-visual materials.

The following pages are examples of :

1) A sample Program Entry.
2) A sample Catalogue Entry from the Basic Program Number Index.

4. ONTERIS

Description: Onteris is a computerized online storage and retrieval system. They have three bibliographic databases:

1) Curriculum Guidelines and Support Documents.
2) Education Research
3) Commissions & Projects

The following two pages give an outline for the curriculum database record and an explanation of the fields used in that record.

Acting Class

Action: The October Crisis of 1970

87:09 col. 106C 0173 141
D: Robin Spry P: Tom Daly, Normand Cloutier, Robin Spry

A long and thoughtful look at those desperate days of October 1970, when Montréal awaited the outcome of FLQ terrorist acts. This film puts the October Crisis in the long perspective of history. Compiled from news and other actuality film, it shows independence movements past and present and their leaders; it reflects the mingled relief, dismay, defiance, when the Canadian army occupied Montréal; and it shows how political leaders viewed the intervention. (See also Reaction: *A Portrait of a Society in Crisis*.) (Awards: Lyon, Chicago.)

Adventures

10:06 col. 106C 0167 222
D: Michael Rubbo P: Nicholas Balla

A film to delight young children, and others too, about a little raccoon who encounters many adventures when he strays from home to explore the world around. The raccoon and all the other creatures in the film are real but are given voices by a little girl and her father. The situations are natural and amusing.

After the Axe

56:28 col. 106C 0181 012
D: Sturla Gunnarsson
P: Sturla Gunnarsson, Steve Lucas

Every year, 250,000 managers get fired in North America. *After the Axe* is a cinematic drama drawn from real life: it examines executive terminations and a new industry which specializes in handling them. The film was made with the cooperation of the business community, which provided authentic locations and even helped script actual scenes on set. The central figure, D.R. "Biff" Wilson, 44, is a composite figure based on extensive conversations with fired executives; the others play themselves.

Afterlife

7:12 col. 106C 0078 280
D: Ishu Patel P: Derek Lamb

What is dying? How does it feel? *Afterlife* is an impressionistic and visionary response to these eternal questions. Based on recent studies, case histories and some of the ancient myths, the after-life state is portrayed as an awesome but methodical working-out of all the individual's past experiences. (Awards: Eight, including Montréal; Chicago; Hong Kong; Annecy.)

POLLUTION. Environment
– Animated films
Air!
Paradise Lost.

POLLUTION. Freshwater biomes
Control
Freshwater World.

POLLUTION. Great Lakes
The Rise and Fall of the Great Lakes.
Control measures
The Great Clean-up.
The Great Lakes: Only If You Care.

POLLUTION. Oceans
– Animated films
Deep Threat.

POLLUTION. Water resources. Third World
Water – the Hazardous Necessity.

POLYGONS
See also
SQUARES
TRIANGLES

POOR FAMILIES. North America
Social problems
The Things I Cannot Change.

POOR PEOPLE
See also
BEGGARS
POVERTY

POP MUSIC
See also
ROCK MUSIC

POPULAR MUSIC
See also
BALLADS
JAZZ

POPULAR MUSIC
– Film interpretations – Animated films
Street Musique.

POPULATION
See also
FAMILY PLANNING
HUMAN SETTLEMENTS
IMMIGRANTS

POPULATION. Urban regions. North America
Absence – *Experimental films*
23 Skidoo.

POPULATION CONTROL. Man
What on Earth Are We Doing?

PORNOGRAPHY
– Sociological perspectives
Not a Love Story: A Film About Pornography.

PORTRAIT PAINTINGS
Canadian portrait paintings. Squires, Gerald
Portrait: Gerald Squires of Newfoundland.

PORTUGUESE SCHOONERS. Newfoundland
Fishing
The White Ship.

POST PARTUM DEPRESSION. New mothers
Post Partum Depression.

POSTAL SERVICES
Mail delivery, *ca. 1938*
News for the Navy.†

POSTAL SERVICES. Canada
– Experimental films
Mail Early.†
Christmas postal services – *Experimental films*
Mail Early For Christmas.†
Mail delivery – *Animated films*
A Tale of Mail.

POSTAL SERVICES. Great Britain
Airmail delivery *ca. 1939* – *Experimental films*
Love on the Wing.†

POT *See* MARIJUANA

POTATOES. New Brunswick
Farming
Potatoes.

POTTERY
Earthware.
Techniques – *Stories – Children's films*
The Story of Peter and the Potter.

POVERTY
See also
BEGGARS

POVERTY. Point St. Charles. Montréal
The Point.

POVERTY. Population. Third World
Attitudes of governments – *Animated films*
Top Priority.

POWER
See also
POLITICAL POWER

POWER PUMPS
Use in control of forest fires – *Guides*
Fighting Forest Fires with Power Pumps.

POWER STATIONS
See also
NUCLEAR POWER STATIONS

PRAIRIE PROVINCES
See also
ALBERTA
MANITOBA
SASKATCHEWAN

PRAIRIE PROVINCES
Farming, *1930-1939*. Life styles. Childhood memories
Prairie Album.
Wheat. Farming
The Changing Wheat Belt.

PRAIRIE PROVINCES. Special subjects. Kurelek, William. Canadian paintings
Kurelek.

PRAIRIES. North America
Buffalo. Hunting, *ca. 1850*
Age of the Buffalo.

PRE-FABRICATED RESERVOIRS
Construction
Reservoir.

PRECIOUS METALS
See also
GOLD

PRECIPITATION. Weather
See also
SNOWFLAKES

PREGNANCY
See also
CHILDBIRTH
CONTRACEPTION

PREGNANCY
Role of nutrition
You're Eating for Two.

PREGNANCY. Adolescents
– Stories
Phoebe.

PREHISTORIC REPTILES
See also
DINOSAURS

PREJUDICE
See also
BIGOTRY
DISCRIMINATION

PREJUDICE
Exposure by children – *Dramatizations*
Teach Me to Dance.

PREMIERS. Québec
Johnson, Daniel – *Biographies*
The Inheritance.
Lévesque, René – *Biographies*
The Champions.

PRESERVATION
See also
CONSERVATION

PRESIDENTS. Chile
Allende Gossens, Salvador. Political views
Salvador Allende Gossens: A Testimony.

PRESS
See also
JOURNALISTS
NEWSPAPERS

PRESS AGENCIES
Multinational press agencies. Monopolies on information on the Third World – *Study examples: Africa*
Distorsions.

PRICE CONTROLS
Role in economy during war – *Animated films*
Dollar Dance.†

PRIMARY COLORS
Introduction – *Children's films – Animated films*
The Little Men of Chromagnon.

PRIME MINISTERS. Canada
Diefenbaker, John
"Dief"!
Trudeau, Pierre Elliott. Participation in politics, *to 1977*
The Champions.

PRISON LIFE
Effects on prisoners
Cell 16.

PRISON LIFE. Canada
– Animated films
Prison.

PRISONERS. British Columbia
Rehabilitation – *Study examples: Seventh Step Society*
The Seventh Step to Freedom.

PRISONERS OF WAR. Japanese internment camps. World War 2
Canadian prisoners of war – *Personal experiences – Feature films*
A War Story.

PRISONS
See also
CONCENTRATION CAMPS
INTERNMENT CAMPS

PROBLEMS
See also
SOCIAL PROBLEMS

PROCESSIONS
See also
MARCHES

PROCRASTINATION
– Humorous treatment – Animated films
Getting Started.

PRODUCTION
See also
INDEPENDENT PRODUCTION

PROFESSIONAL TEAMS. Hockey. Québec
Nordiques
Just Another Job.

PROFESSIONAL WRESTLING
Wrestling.

PROGRAMS
See also
EXCHANGE PROGRAMS
TELEVISION PROGRAMS

PROLETARIAT *See* WORKING CLASS

PROPORTIONS
– Animated films
Dimensions.

PROSPECTORS. Vancouver Island
Life styles
David and Bert.

PROSTHESES *See* ARTIFICIAL LIMBS

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†See McLaren section

2.

2.

Key To The NICSEM Database
(Search Label — NIMI)

Paragraph Label	Content of Paragraph	User Function
AN	Accession Number	search
NO	Library of Congress Number and ISBN Number	search
AU	Author	search
TI	Title of Material	search
SE	Series Reference Note	search
YR	Copyright or Production Year	search/limit
PB	Publisher/Producer and/or Distributor and Corresponding Codes	search
PR	Price of Item and Year for Which it is Current	search/ character limit
PD	Physical Description	search
AL	Academic Level	search
RL	Reading Level	search
IL	Interest Level	search
PM	Presentation/Response Mode	search
TC	Table of Contents	search
NT	Notes	search
MC	Media Code	search
DE	Descriptors	search
ID	Identifiers	search
AB	Abstract	search

Sample BRS/NICSEM Citations

AN	00009725.
NO	ISBN: 0-8116-6319-1.
AU	BY LATHAM, JEAN LEE.
TI	ELIZABETH BLACKWELL: PIONEER WOMAN DOCTOR.
SE	FROM THE DISCOVERY SERIES.
YR	C. 1975.
PB	PUBLISHER: GARRARD PUBLISHING CO. (GARARD). 1607 N. MARKET ST. CHAMPAIGN, IL 61820. DISTRIBUTOR: GARRARD PUBLISHING CO. (GARARD). 1607 N MARKET ST. CHAMPAIGN, IL 61820.
PR	1979 $4.48.
PD	P. PRINT FORMAT, 80 PAGES, HARD-COVER, HICU.
RL	READING: 2.1.
IL	INTEREST: P-E.
MC	BB.
DE	STORIES-ABOUT-WOMEN. HISTORICAL-STORIES.
AB	RECOUNTS THE CAREER OF ELIZABETH BLACKWELL AND THE PREJUDICE SHE FOUGHT ON HER WAY TO BECOMING THE FIRST WOMAN DOCTOR IN THE UNITED STATES.

AN	00007974.
AU	ED HARING, NORRIS G.
TI	DEVELOPING EFFECTIVE INDIVIDUALIZED EDUCATION PROGRAMS FOR SEVERELY HANDICAPPED CHILDREN AND YOUTH.
YR	P. 1977.
PB	PUBLISHER: U S BUREAU OF EDUCATION FOR THE HANDICAPPED. (USBEH). DISTRIBUTOR: SPECIAL PRESS. (SPEPRE). 724 S ROOSEVELT. COLUMBUS, OH 43209.
PR	1978 $10.95.
PD	PRINT FORMAT, 337 PAGES, SOFT-COVER.
TC	CONTENTS: ASSESSMENT, EVALUATION, MANAGEMENT: AN INTRODUCTION; DEVELOPMENT OF INDIVIDUAL EDUCATION PROGRAMS; A MULTIAGENCY INTERACTIONAL COOPERATIVE MODEL; APPRAISAL: A PROCESS FOR IDENTIFYING PROBLEMS AND POTENTIALS; MOTOR SKILLS; SOCIAL SKILLS; COGNITIVE SKILLS; OCCUPATIONAL EDUCATION: ASSESSMENT AND IMPLEMENTATION; PRINCIPLES OF ASSESSMENT FROM THE INTERDISCIPLINARY TEAM; ACTION: OUTCOMES OF THE CONFERENCE; AND CONCLUDING GENERAL SESSION AND STRATEGY.
MC	BB.
DE	SEVERE-HANDICAPS. IEP-DEVELOPMENT. SEVERELY-HANDICAPPED-ASSESSMENT. EXCEPTIONALLY-SPECIFIC-INSTRUCTIONAL-METHODOLOGIES.
ID	AMERICAN ASSOCIATION FOR THE EDUCATION OF THE SEVERELY-PROFOUNDLY. HANDICAPPED.
AB	CONTAINS PAPERS PRESENTED AT AN AUGUST, 1977 NATIONAL CONFERENCE ON THE IEP FOR SEVERELY HANDICAPPED LEARNERS. COVERS ASSESSMENT TOPICS.

CANADIAN AUDIO-VISUAL PRODUCT INFORMATION / DISTRIBUTION SYSTEM
SYSTÈME D'INFORMATION / DISTRIBUTION DES PRODUITS AUDIO-VISUELS CANADIENS

MASTER INPUT FORM / FORMULE D'ENTRÉE DES DONNÉES

Title/ Titre:

Series title/ Titre de la série:

Title number/ Numéro du titre:

Language of title being reported/ Langue – titre inscrit:

Language of original production/ Langue – production originale:

Producing institution/ Maison de production: [1]

Address/ Adresse:

Year of production/ Année de la production:

Date of release/ Date de sortie:

Sponsor/ Commanditaire: [2]

Address/ Adresse:

Medium Description/ Médium utilisé:
Film/ Film: ☐
Filmstrip/ Film fixe: ☐
Video/ Vidéo: ☐
Multi-media/ Multi-média: ☐
Other/ Autre:

CREDITS:

Director/ Réalisateur:

Producer/ Producteur:

Script/ Scénario:

Music/ Musique: [5]

Narrator/ Narrateur:

Photography/ Photographie:

Sound/ Son:

Editing/ Montage:

Cast/ Distribution:

Other/ Autre:

Type/ Genre: [6]

Synopsis: [7]

Format – title being reported/ 3
Format – titre inscrit: ______

Format – original production/
Format – production originale: ______

Running time/
Durée: ______ Colour Couleur ☐ B&W N&B ☐

No. of reels/
Nombre de bobines: ______ No. of frames (filmstrip)/ Nombre de cadres (film fixe): ______

Sound/ Son: Silent/ Muet: ☐ Optical/ Optique: ☐ Magnetic/ Magnétique: ☐

Tape/ Ruban: ☐ Disc/ Disque: ☐ Cassette: ☐

Sub-titled/ Sous-titres: ☐ Dubbed/ Doublage: ☐ Voice-over/ Voix sur dialogues: ☐

Classification: L.C. ______

D.D.C. ______

U.D.C. ______

Subject headings/
Vedette matières: L.C. ______

Level ______

I.S.F.N.: ______

"Precis" String/ 4
Chaîne du format "Précis": ______

Intended audience/ 8
Auditoire visé: ______

Data report completed by/
Données enregistrées par: ______

Reporting organisation/
Données fournies par: ______

Address/
Adresse: ______

Date: ______

Work 2.

The finished film, filmstrip, video, multi-media or other product being entered on the data base.

Use continuation form for extensions of any item or remarks for which additional space is required.

1 **Producing Institution**

The producing company, institution, or individual is the one which does the physical processes of making the work.

2 **Sponsor**

The company, institution, or individual that commissions and pays for the production in whole or in part. If more than one sponsor list each. If producer and sponsor are the same, please note.

3 **Format**

Physical description of the production, for example:

8 mm; 16 mm; 35 mm; ½; ¾; multi media

4 **"Precis" String (Library terms)**

If you cannot complete these items, please provide additional documentation, such as script, promotional material, catalogue annotation, or an item which best describes in depth the content of the work.

5 **Music**

The theme or major composition of a given work. Please provide title and composer if possible.

6 **Type**

Treatment of a given piece of work, for example: animation, live action, scripted, documentary, fiction, non-fiction. (a work may have more than one listing)

7 **Synopsis**

An objective summary of the actual content of the production.

8 **Intended audience**

Identify the audience, there can be more than one, that the work was made for:

K- Pre-school to Kindergarten
P. Primary (1-3)
I - Intermediate (4-6)
J- Junior High School (7-9)
H- High School (10-12)
C- Junior College, Cegep, and University
T- Teacher Education (designed for training teachers)
A- Adult Education
G- General (covers most categories)
S- Special Education (designed for special audiences such as physically handicapped, mentally retarded, and gifted)
R- Religious (designed to project a religious message, moral, or philosophy)
PRO- Professional use (designed for such groups as medicine, dentistry, and law)
IND - Industrial use (designed for use in industrial training)

9 **Notes on Restricted Use**

Works may have restricted distribution with respect to:

1) form of distribution (T.V., sales, theatrical, etc.)
2) territory and/or language
3) length of time of rights or number of exhibitions

Works may be restricted because:

1) the rights acquired from contributing artists (actors, writers, musicians, etc.) or a constituent part (stock shot, etc.) are limited
2) rights have been granted to a distributor.
3) a sponsoring agency or other third party may wish to have restricted distribution for specific reasons.

10 **Reviews**

Please list critical reviews of the work which have appeared in periodicals, film magazines, national or international evaluations.

11 **Presentation Format**

Any unique features of the production, for example: cinema scope, stereo sound, multi-image, sub-titled

Produit 2

Film terminé, film fixe, vidéo, multi-media et tout autre produit dont les données doivent être introduites en mémoire.

Utiliser l'endos du formulaire pour donner la suite des renseignements ne tenant pas dans l'espace prévu:

1 **Maison de production**

La maison de production, soit une institution ou un particulier dont relève la production proprement dite du produit.

2 **Commanditaire**

La société, l'institution ou le particulier qui commande le produit et qui en assume les coûts en tout ou en partie. S'il y a plus d'un commanditaire, les nommer tous. Si le producteur est également le commanditaire, le mentionner.

3 **Format**

Description physique du produit. Exemple:

8 mm; 16 mm; ½, ¾, multi-média

4 **Chaîne du format "Précis" (terme de bibliothéconomie)**

Si vous ne pouvez fournir ce renseignement, en fournir d'autres soit: scénario, matériel promotionnel, commentaires figurant au catalogue ou tout renseignement décrivant au mieux la nature du produit.

5 **Musique**

Le thème ou la principale pièce musicale qui accompagne le produit. Donner si possible le titre de la pièce et le nom du compositeur.

6 **Genre**

Traitement du sujet. Exemple: animation, scènes sur le vif, scénario, documentaire, fiction, réalité. (Il peut y avoir plus d'un genre par produit)

7 **Synopsis**

Résumé objectif du contenu réel du produit.

8 **Auditoire visé:**

Préciser l'auditoire ou les auditoires visés:

K- pré-maternelle à maternelle
P- élémentaire - 1er cycle (1ère à 3e année)
I - élémentaire - 2e cycle (4e à 6e année)
J- école secondaire - 1er cycle (7e à 9e année)
H- école secondaire - 2e cycle (10e à 12e année)
C- Junior college, cégep et université
T- formation des enseignants
A- éducation permanente
G- généralités (comprend presque toutes les catégories)
S- éducation spéciale (pour des auditoires particuliers, ex.: handicapés physiques, déficients mentaux, surdoués)
R- religion (pour transmettre un message religieux, moral ou philosophique)
PRO-domaine professionnel (pour des groupes particuliers, ex.: médecins, dentistes, avocats)
IND -domaine industriel (pour la formation industrielle)

9 **Distribution restreinte**

La distribution d'un produit peut être restreinte en ce qui a trait:

1) au type de distribution (télévision, vente, commerciale, etc.)
2) au territoire et (ou) à la langue
3) à la durée des droits ou au nombre de représentations

Peuvent aussi être la cause de restrictions:

1) la limitation des droits acquis des artistes participants (acteurs, écrivains, musiciens, etc.) ou pour une partie constituante (métrage d'archive, etc.)
2) les droits accordés à un distributeur
3) le désir d'un organisme commanditaire ou d'un tiers de restreindre la distribution pour des motifs précis.

10 **Critiques**

Enumérer les critiques parues dans les périodiques, les revues de cinéma, les cotes nationales et internationales.

11 **Effets spéciaux**

Tout procédé particulier de production.

Exemple: cinémascope, stéréophonie, multi-image, sous-titres.

2.

Distributor's name/
Nom du distributeur:

Address/
Adresse:

	Yes/ Oui	No/ Non	
Sale/ Vente:	☐	☐	Price range/ Echelle des prix:
Rental/ Location:	☐	☐	Price range/ Echelle des prix:
Free loan/ Prêt:	☐	☐	

Borrowing Restrictions/
Restrictions concernant les prêts:

Purchase Restrictions/
Restrictions concernant l'achat:

Reproduction Restrictions/
Restrictions concernant la reproduction:

2.

Awards/
Prix:

Name/
Nom:

Year/
Année:

Presentation format/ [11]
Effets spéciaux:

M& E Track / Bande internationale: ☐

	Yes/ Oui	No/ Non	Description:
Accompanying materials/ Documents d'accompagnement:	☐	☐	

Notes on Restricted Use/ [8]
Distribution restreinte:

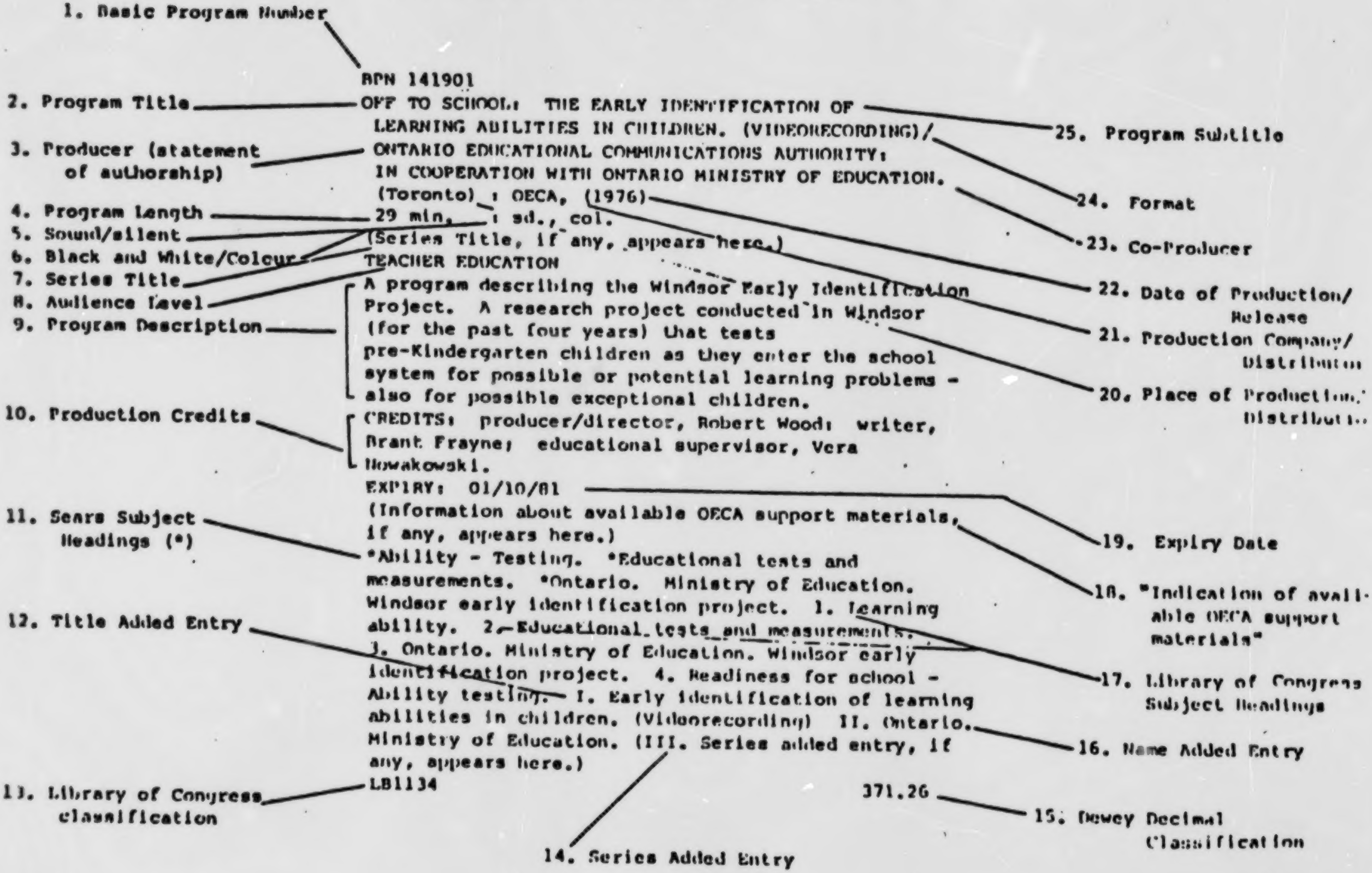
Union Listings/
Répertoire des fonds de bibliothèques collectifs:

Reviews/ [10] Critiques:	Name of publication/ Publications:	Dates:	Pages:

Reviews/ Critiques:	Publications:	Dates:	Pages:

SAMPLE PROGRAM ENTRY

Listed Numerically by Basic Program Number



BPN 141901
OFF TO SCHOOL: THE EARLY IDENTIFICATION OF
LEARNING ABILITIES IN CHILDREN. (VIDEORECORDING)/
ONTARIO EDUCATIONAL COMMUNICATIONS AUTHORITY:
IN COOPERATION WITH ONTARIO MINISTRY OF EDUCATION.
(Toronto) : OECA, (1976)
29 min. : sd., col.
(Series Title, if any, appears here.)
TEACHER EDUCATION
A program describing the Windsor Early Identification Project. A research project conducted in Windsor (for the past four years) that tests pre-Kindergarten children as they enter the school system for possible or potential learning problems - also for possible exceptional children.
CREDITS: producer/director, Robert Wood; writer, Brant Frayne; educational supervisor, Vera Nowakowski.
EXPIRY: 01/10/81
(Information about available OECA support materials, if any, appears here.)
*Ability - Testing. *Educational tests and measurements. *Ontario. Ministry of Education. Windsor early identification project. 1. Learning ability. 2. Educational tests and measurements. 3. Ontario. Ministry of Education. Windsor early identification project. 4. Readiness for school - Ability testing. I. Early identification of learning abilities in children. (Videorecording) II. Ontario. Ministry of Education. (III. Series added entry, if any, appears here.)
LB1134 371.26

1. Basic Program Number
2. Program Title
3. Producer (statement of authorship)
4. Program Length
5. Sound/silent
6. Black and White/Colour
7. Series Title
8. Audience Level
9. Program Description
10. Production Credits
11. Sears Subject Headings (*)
12. Title Added Entry
13. Library of Congress classification
14. Series Added Entry
15. Dewey Decimal Classification
16. Name Added Entry
17. Library of Congress Subject Headings
18. "Indication of available OECA support materials"
19. Expiry Date
20. Place of Production/Distribution
21. Production Company/Distribution
22. Date of Production/Release
23. Co-Producer
24. Format
25. Program Subtitle

BPN 166402
[TOWARDS AN ULTIMATE SYSTEM].
[VIDEORECORDING] / ONTARIO EDUCATIONAL COMMUNICATIONS AUTHORITY ; IN COOPERATION WITH GOVERNMENT OF CANADA, DEPARTMENT OF COMMUNICATIONS. [Toronto] : OECA, c1978.-
29min. : sd., col. & program guide.-
(Fast forward [Videorecording])
ADULT; YOUTH
A look at today's internationally competitive market place for total information networks and their technological components: color TV, computer, and telephone.
CREDITS: writer, Sheldon Greenberg; executive producer, Stephen Patrick; producer/director, Jim St. Lawrence.-
EXPIRY: 05/09/83
Program guide(48p) available from OECA.-
*Computers. *Information networks. *Telecommunications. 1. Computer networks. 2. Information networks. 3. Telecommunication systems. I. Canada. Dept. of Communications.
TK5105.5 621.3819592

BPN 166403
[PERSONAL COMPUTING]. [VIDEORECORDING] / ONTARIO EDUCATIONAL COMMUNICATIONS AUTHORITY ; IN COOPERATION WITH GOVERNMENT OF CANADA, DEPARTMENT OF COMMUNICATIONS. [Toronto] : OECA, c1978.-
29min. : sd., col. & program guide.-
(Fast forward [Videorecording])
ADULT; YOUTH
Computer-owners -- adults as well as children -- talk about the fascinating challenge of learning to program their machines to provide them with fun and games.
CREDITS: writer, Sheldon Greenberg; executive producer, Stephen Patrick; producer/director, Jim St. Lawrence.-
EXPIRY: 16/09/83
Program guide(48p) available from OECA.-
*Microcomputers. *Minicomputers. 1. Microcomputers. 2. Minicomputers. I. Canada. Dept. of Communications.
QA76.5 001.6404

BPN 166404
[GLOBAL TV POLITICS]. [VIDEORECORDING] / ONTARIO EDUCATIONAL COMMUNICATIONS AUTHORITY ; IN COOPERATION WITH GOVERNMENT OF CANADA, DEPARTMENT OF COMMUNICATIONS. [Toronto] : OECA, c1978.-
29min. : sd., col. & program guide.-
(Fast forward [Videorecording])
ADULT; YOUTH
Experts analyze the increasingly complex aspects of international electronic newsgathering, satellite microwave transmittal, signal piracy -- and the chaotic proliferation of videotape formats.
CREDITS: writer, Sheldon Greenberg; executive producer, Stephen Patrick; producer/director, Jim St. Lawrence.-
EXPIRY: 22/09/83
Program guide(48p) available from OECA.-
*Television. 1. Television. 2. Television - Transmitters and transmissions. 3. Television broadcasting of news. I. Canada. Dept. of Communications.
TK6651 621.388

BPN 166405
[HUMANIZING THE TECHNOLOGY]. [VIDEORECORDING] / ONTARIO EDUCATIONAL COMMUNICATIONS AUTHORITY ; IN COOPERATION WITH GOVERNMENT OF CANADA, DEPARTMENT OF COMMUNICATIONS. [Toronto] : OECA, c1978.-
29min. : sd., col. & program guide.-
(Fast forward [Videorecording])
ADULT; YOUTH
Specialists demonstrate current achievements in robotics: responsive machines that interview hospital patients, teach deaf children to speak more clearly; industrial robots, composed of hydromechanics and computer-brains, that perform monotonous, health-hazardous jobs.
CREDITS: writer, Sheldon Greenberg; executive producer, Stephen Patrick; producer/director, Jim St. Lawrence.-
EXPIRY: 22/09/83
Program guide(48p) available from OECA.-
*Automata. *Robots. 1. Automata. 2. Conscious automata. 3. Robots, Industrial. I. Canada. Dept. of Communications.
QA267 629.892

BPN 166406
[BIO-MEDICS]. [VIDEORECORDING] / ONTARIO EDUCATIONAL COMMUNICATIONS AUTHORITY ; IN COOPERATION WITH GOVERNMENT OF CANADA, DEPARTMENT OF COMMUNICATIONS. [Toronto] : OECA, c1978.-
29min. : sd., col. & program guide.-

4. 4.

A CURRICULUM DATABASE IN PROGRESS RECORD

CD01283 ①

② MATERIAL TYPE: Resource Document

③ MATERIAL STATUS: IN PROGRESS; Revision

LANGUAGE OF DOCUMENT: English

④ COORDINATOR: Morrison, I.

CORPORATE AUTHOR: Ontario Ministry of Education

BRANCH RESPONSIBLE: Elementary Education Branch

⑤ TITLE: Child Development-Parenting (Family Studies)

⑥ SERIES: Curriculum ideas for teachers : Family Studies, intermediate division

CURRICULUM SUBJECT: Family Studies

DIVISION: Intermediate Division

⑦ AVAILABILITY: Curriculum in progress. No documents available at present

EXPLANATION OF A CURRICULUM DATABASE RECORD

1. CURRICULUM DOCUMENT OR CD NUMBER: A unique identifying number is given to each document.
2. MATERIAL TYPE: A description of the type of document is given by using the appropriate term from: guideline, handbook; bibliography; resource document.
3. MATERIAL STATUS: This is included as a means of differentiating between material currently in force and that which has been superseded. When the document is superseded, the CD number of the current edition is given in the Notes section.
4. LANGUAGE OF DOCUMENT
5. PERSONAL OR CORPORATE AUTHOR: For machine searching purposes, one version of the name is used consistently. If there are both a personal and a corporate author, the personal author precedes the corporate author.
6. BRANCH RESPONSIBLE: For ministry curriculum documents, the issuing branch is identified, as are, if included in the document, the name(s) of the compiler(s).
7. TITLE: This is given as it appears on the title page or, in the absence of a title page, the cover.
8. PLACE OF PUBLICATION
9. DATE OF PUBLICATION: If no date is available, the date of the receipt of the document at ONTERIS is given.
10. PAGINATION
11. CURRICULUM SUBJECT: A standardized list of curriculum subjects based on Ministry of Education subject areas is used.
12. DIVISION: The grade and division is entered as indicated on the document, e.g., Intermediate Division or Grade 3 or Year One. In order to provide access to all divisions covered by a document, a wide grade range such as kindergarten - grade 13 would be entered as follows: Primary Division; Junior Division; Intermediate Division; Senior Division. Levels of instruction, such as modified, basic, general, and advanced in grades 9-13, are indicated if they are specified in the document.
13. TARGET POPULATION: When a document has been prepared for use with or by a special group (e.g., exceptional students, adults, etc.) that group is indicated.
14. CONTENT: More detailed and flexible than an indicative abstract, this field provides a description of the contents of a document, reflecting its specificity.
15. NOTES: Related records, French versions, and other bibliographic notes are given to link documents.

APPENDIX V

CLEARINGHOUSES - EDUCATIONAL SOFTWARE

INTRODUCTION

The following is a list of organizations presently collecting educational software or information about these materials. They are not databases of educational research but attempt to serve classroom teachers with currently available materials and programs. The list is brief and includes only major organizations.

There are numerous groups in Canada collecting software at the provincial level. Most of these groups are focusing on developing criteria for evaluating the instructional design of courseware and the effectiveness of the program.

Once a systematic procedure for analyzing and evaluating educational software programs is designed for school use, these groups will be able to share their information with other educational organizations.

CONDUIT - The continuing activity of CONDUIT is to search for and distribute computer-based learning materials for undergraduate instruction. The materials are reviewed by content experts and, when possible, by instructors who have used the materials in the classroom. After review, the materials are packaged for distribution.

Conduit packages provide manuals for students, recommendations for using the materials in the classroom and the software. Conduit staff test the programs for technical performance and modify to improve clarity of input, output & ease of use.

Contact:
Computing Ideas for Education
100 Lindquist Center
The University of Iowa
P.O. Box 388
Iowa City, IA. 52244
(319) 353-5789

MECC - (Minnesota Educational Computing Consortium) provides computer services to students, teachers, and educational administrators. They coordinate and assist in planning educational computing activities. Their Instructional Services

Division manages and operates the statewide timesharing network which serves as a tool for providing information to increase the effectiveness of instruction. They also have a program library of over 950 computer programs which supplement curricula on the elementary, second ary and college level.

Contact:
Minnesota Educational Computing Consortium
2520 Broadway Drive
Saint Paul, Minn. 55113
(612) 376-1122

MICROSIFT - Microsift is a clearinghouse engaged in collecting, organizing and disseminating information for microcomputer-based applications in education. It has designed and field tested an evaluation model for instructional applications based on the cooperation of a network of organizations that serve a large number of schools and provide significant work in the area of instructional computing.

Contact:
Northwest Regional Educational Laboratory
710 S.W. Second Ave.
Portland, Oregon 97204

SOFTSWAP - Softswap is a library of educational software for microcomputers. They evaluate, edit and organize non-commercial public domain programs for the purpose of free exchange of instructional software for classroom use.

Contact:
Library
San Mateo County Office of Education
333 Main St.,
Redwood City
California 94063

TERC - The Technical Education Research Centers' Inc. (TERC) and the Computer Resource Center (CRC) maintain a database of educational programs for microcomputers. This educational exchange allows teachers to locate software, submit their own software and evaluate programs.

CRC/TERC
8 Eliot Street
Cambridge, MA 02138

VOLUME III

APPENDICES

Joint Provincial Courseware
Cataloguing and Indexing
Project

JEM Research
June/1982.

APPENDIX VI

CLEARINGHOUSES - EDUCATIONAL RESOURCES

INTRODUCTION

The following is a partial list of organizations involved in the collection and dissemination of information about educational resource materials.

Most provinces in Canada have media centers or resource centers that collect various forms of media and/or information about them. They are evaluated by the Ministry of Education, then organized and distributed to schools in the province.

The difference between these two types of organizations is that the former concentrates on information about products available while the latter actually collects materials, but only those which are recommended or prescribed by the individual Ministries of education.

E.P.I.E. (Educational Products Information Exchange)

EPIE provides information on educational material. Its purpose is to help educators select wisely from among the growing number of educational products and to help teachers make the most effective use of instructional materials. The institute provides a cost-sharing information service to educational consumers throughout Canada and the United States. Alberta, Manitoba and British Columbia are part of the Canadian EPIE exchange.

The EPIE system is based on an instructional framework, using a common language and common system. The system looks at materials to determine:

1) intents
2) contents
3) methodology
4) means of evaluation

ERIC (Educational Resources Information Center)

Eric is a clearinghouse for information resources. Its purpose is to disseminate as widely as possible information about timely and significant materials of interest to the educational community. Documents are announced monthly in the abstract journal of the ERIC system. Resources in Education (RIE). These are made available to users in microfiche and paper copy and sold through the ERIC Document Reproduction Services (edrs). Credit is given to the source of each document, and a reproduction release may be granted. In addition, ERIC provides an index to educational literature available in published journals. Abstracts are available in the Cumulative Index to Journals in Education (CIJE).

FORMAT

FORMAT is a fully bilingual national computerized audiovisual information system. It provides comprehensive information about relevant Canadian film material and plans to eventually accommodate all audiovisual products. The database is organized according to international audiovisual library standards. Information from FORMAT is currently available in hard-copy and will soon be available in an online mode to meet specific requirements of its users.

FORMAT, a central data bank and retrieval system provides

1) bilingual access
2) easy subject/content searches for films
3) national coverage of materials
4) shared cataloguing facilities
5) information on where to book films available from private Canadian distributors
6) film previewing for rental or purchase
7) feedback; allows for a flow of information back and forth between users and cataloguers, which ensures up to date and complete data.

FORMAT
National Film Board of Canada
Distribution Branch D-11
C.O. Box 6100
H3C 3H5
Montreal, P.Q.
(514) 333-4524

NICEM

The National Information Center for Educational Media, located at the Univeristy of Southern CA, has indexed, catalogued and disseminated information on nonprint educational materials since its inception in 1964. To date, fourteen major indexes have been developed and published, each arranged by subject and single media or multimedia volumes.

NICEM is available online through Lockheed Information Systems (DIALOG) service. Their current guides for formatting entries are: Anglo-American Cataloguing Code & AECT's (Assoc. for Education Communications & Technology) Standards for non print media. They have a number of searchable indexes online with eight bibliographic elements in each database entry.

NICSEM

Nicsem is one of the fourteen major indexes developed and published by NICEM. NICSEM was established in 1976 at the University of Southern California to develop a national bibliographic information retrieval system focusing on both print and non-print educational materials suitable for use with the handicapped.

NICSEM offers detailed information in a bariety of formats on media and materials resources. Entries in the index are selected by topic area (subject headings & sub categories) and audience level.

OECA

OECA is a provincial crown agency whose mandate is to provide educational opportunities to the residents of Ontario through the use of television and associated media. The OECA distributes 31,000 video recordings to Ontario school boards, post-secondary institutions and public libraries. Presently they catalogue their own materials online and are preparing for the development of an information retrieval system that will fulfill the requirements of its many diverse user groups.

Bibliographic standards for the OCEA file were developed using the Canadian MARC format for audio visual materials as the authority for the mediagraphic content & tagging structure of the standards. AACR2 is used as the standard for cataloguing. Library of Congress Subject Headings, Sears Subject Headings and Universite Laval Subject Headings are standards for content analysis. The material is file indexed by OECA's Basic Program Number (BPN) To date, over 11,000 video recordings have been catalogued and input to the UTLAS file.

OECA
Cheryl Zimmerman/Ruth Brass
The Ontario Educational Communications Authority
P.O. Box 200
Station Q
Toronto, Ontario
M4T 2T1
(416) 484-2600

SPIF

The School Practices Information File (SPIF) is produced by the BRS Education Service Group. The database contains descriptions of educational practices, programs, materials and products currently in operation or in use. Database citations refer users directly to the source materials. Included are descriptions of audiovisual materials, as well as microcomputer software and courseware listings.

Standard field designations of title, author, publisher, etc. are enhanced by fields which make selections of educational resources which are specific to user requirements much easier. These fields include:

EV - evaluation information
CP - contact information
AV - availability information
RT - resource type
GL - grade level
TG - target audience
AB - detailed abstract

Deborah Pietro
BRS/ESG 1200 Route 7
Latham, NY 12110
(518) 783-1161

APPENDIX VII

INFORMATION RETRIEVAL PACKAGES

INTRODUCTION

The following is a summary list of some software suitable for maintaining a database of information concerning educational software. Since selection of a delivery system is a suggested phase for further study, a detailed evaluation of each system will not be included in this report.

AUTO-INDEX

is software designed for indexing, it provides a range of features features and options that permit control over processing, output and format. These include:

1) standard null word list
2) word of phrase designation
3) selective document processing
4) cross-referencing (use KWIC)
5) adjustable context
6) control of format
7) field redefinition
8) index merge
9) intermix of datatype

Aspen software can be applied to a variey of databases, and is currently used by scientific and educational organizations.

Aspen Systems Cooporation
1600 Research Blvd.
Rockville, Md. 20850
(301) 251-5000

BASIS- (Batelle Automated Search Information System).

is a flexible method of handling and retrieving textual, bibliographic, and numeric information. Each record is indexed by relevant words, phrases and numerics, so that required information may be rapidly located, manipulated and displayed. A database would be custom designed in terms of file format. BASIS can accommodate as many fields as needed for retrieval. Other modules can be used for online inputting of records, to create a thesauras, to save searches, to sort output, and to monitor system usage.

INFORMART Head Office
164 Merton St.
Toronto, Ontario
M4S 3A8

BIBPRO IV - (Bibliographic MARC Record Processing System)

Software from BIBPRO allows for online search and retrieval, keyword indexes, subject, author cumulative indexes, and permuted subject indexes. Searching is assisted by online thesauri.

Infomatics In.
Information Services Group
IRMS Division
6011 Executive Blvd.
Rockville, MD.
20852 U.S.A.

BRS - Bibliographic Retrieval Services

The BRS search system combines sophisticated & flexible searching techniques - is structured so that a user can sign on to the system, enter a complicated search strategy, retrieve results and sign off with a minimum of interaction. The results of a search may be printed offline at the BRS Computer Center.

Other features of BRS are:
1) the root feature
2) truncation feature
3) free-text positional searching
4) field qualification feature
5) cross data search capability (BRS/CROSS)
6) BRS/MERGE capability
7) save search feature
8) automated SDI feature with online editing capability

1200 Route 7
Latham, New York 12110
(518) 783-1161

CAN/OLE (Canadian Online Enquiry)

CAN/OLE was created in 1973 jointly by the Canadian Institute for Scientific & Technical Information (CISTI) and the National Research Council Computation Center. It is an online information retrieval system currently being used by more than 60 institutions in Canada to access over three-million citations culled from the world's scientific and technical literature.

OLE is a means whereby anyone is Canada with a telephone and a a computer terminal can pose questions to a database containing leads to several million answers. The computer in Ottawa is given instructions through a set of ten basic commands, allowing a person to engage in dialogue with the machine and within minutes, possibilites are narrowed down to a small highly relevant set of citations.

The main problems with the system can be grouped into three broad categories: cost, complexity and impact.

Contact: James Heilik
Cisti Systems Design & Development Section
Ottawa, Ontario

DIALOG PRIVATE FILE SERVICE

- offers public access to over 130 databases.
- online indexes are created online, (the record is indexed by every word automatically).

There are some drawbacks to the system:

1) files have to be in machine-readable form-properly formatted or the conversion is expensive.

2) the file can only be updated online by Dialentry and text editing is possible only at entry stage. It is not possible to add new information to alter the data.

in CANADA contact:
Ms Ulla de Stricker
Micromedia Ltd.
144 Fort St. W.
Toronto, Ontario
M5J 2L7
(416) 593-5211

EASY DATA SYSTEMS LTD.

has developed library catalogue software designed to run on Datapoint minicomputers. The finshed products can either be microfiche or a computer-printed book catalogue.

401-1200 Lonsdale
North Vancouver
British Columbia
(604) 986-8261

FACTMATCHER

Factmatcher's information retrieval technique is also suited to bibliographic data. It combines fixed field format statements with an automatic prefixing technique. Searches can be either for specific fields or free text or a combination.

Mini-Computer systems, Inc.
399 Fairview Park Drive
Elmsford, N.Y. 10523

FORMAT

This system assists the Canadian film industry and community in the selection, acquisition and utilization of Canadian non-print media. It is bilingual and input is handled according to the format specifications of machine-readable cataloguing designed by the National Library of Canada.

FRECIS (Preserved Context Index System) is used to provide subject access to the film file.

The film records are stored in CAN/MARC format according to the latest specifications of the National Library.

The information in the system is available through 2 output modes:

1) offline (microfiche and print catalogue)
2) online

IBIS (Inforonics' Bibliographic Information Services)

is a bibliographic system that is flexible, allowing for many levels of cataloguing detail, online access for input and retrieval. It also can provide printouts for several different fields.

Inforonics Ltd.
550 Newtown Rd.
Littletown, MA. 01460

INMAGIC

is a library management company which allows for storage, organization, and retrieval of information about company reports, client and personnel files, catalogues, and library collections. Users can search, update and change data online as well as receive print formats such as labels and reports. The program is written in Fortran IV for Hewlett Packard, Digital Equipment Corporation and IBM equipment.

Madeline Miele
Director of Sales & Marketing
Warner-Eddison Assoc., Inc.
186 Alewife Brook Parkway
Cambridge, Mass. 02138

MABRA

is a private file that can manage a collection of any type of document or item. The number of fields is unlimited, but fields can be no longer than the line length. A file can be entered online and searched immediately, or batched for next day searching.

I.P. Sharp Assoc.
902-700 West Pender St.

Vancouver, B.C.
V6C 1G8
(604) 687-8991

MINISIS

is a database management system oriented towards bibliographic information. It combines the functions of both an acquistions and a cataloguing system into one database. Possible online functions include data entry, modification of records, sorting records into various orders for indexes (KWIC, KWOC, alphabetical author etc.) printing of specific records, and retrieving records.

Systemhouse
900 West Hastings St.
Vancouver, B.C.

QL PRIVATE FILE SERVICE

Input data for the QL Retrieval System does not have to conform to any pre-defined format. Storage printing and set up costs are probably the lowest of any of the other systems mentioned but search costs can be expensive, retrieval is cumbersome and less flexible.

QL Systems Ltd.
1018 Tower B,
Place de Ville
112 Kent St.
Ottawa, Ontario
K1P 5P2
(613) 238-3499

RESEARCH & RETRIEVAL SYSTEM

is designed to classify and retrieve documents, internal research, the contents of a library and legal precedents. It was designed for law firm libraries and does not have a great number of fields.

Manac Systems International Ltd.
1730 Place Ville Marie
Montreal, Quebec
H3B 2C1

SPIRES (Stanford Public Information Retrieval System)

Originally developed for Stanford University Library automation system, SPIRES has been used by many other organizations for rather diverse applications.

It has the facility for online indexing and entry. It is good for building private files, as it can handle both bibliographic data as well as numeric and structured data. The user sets up his own file definition. The Universities of Alberta, Waterloo and B.C. have acquired SPIRES software for their computer centres. Many Canadian educational institutions use it through the UBC and U of A's computers, in lieu of mounting it in-house.

SPIRES contact person
G.A. (Nita) Cooke
Boreal Institute Library
CW 401 BioScience Building
University of Alberta
Edmonton, Alberta
T6G 2E9

STAIRS - Storage & Information Retrieval Systems is an IBM software package. It is a multiple-user system that allows:

- interactive creation and storage of databases of documents.
- expansion of existing databases.
- retrieval of data from databases according to specified criteria through an interactive dialogue with the system.
- retrieved data to be displayed at a terminal and/or printed on a high-speed printer.

The STAIRS system was adapted for use as an online card catalogue in a corporate library system. One of the major disadvantages is the inability to make corrections to a database entry quickly and easily.

IBM Canada Ltd.
701 West Georgia St.
P.O. Box 10132
Vancouver, B.C.
V7Y 1G1
(604) 665-8200

APPENDIX VIII

EVALUATION OF EDUCATIONAL SOFTWARE

INTRODUCTION

This appendix includes examples of evaluation formats used by organizations involved in educational software collection, evaluation or dissemination.

The appendix has two catagories:

A) Examples of Evaluation Forms and Methods

B) Articles on Evaluation of Educational Software.

A) EXAMPLES OF EVALUATION FORMS AND METHODS

	NAMES	ADDRESSES
1.	Creative Educational Services	386 St. Clements Ave. Toronto, Ontario M5N 1M1 (416) 488-9905
2.	ECOO (Educational Computing Organization of Ontario)	ECOO Newsletter June/81 2(2) p.35
3.	E.P.I.E. Institute (Educational Products Information Exchange)	EPIE P.O. Box 620 Stony Brook, NY 11796 (516) 246-8664
4.	Guidelines for Evaluating Computerized Instructional Materials Heck, William P. Johnson, Jerry Kansky, Robert J.	Instructional Affairs Committee National Council of Teachers of Mathematics
5.	JEM Research Joint Educational Management Research	Discovery Park University of Victoria P.O. Box 1700 Victoria, B.C. V8W 2Y2
6.	MicroSIFT Computer Technology Program	Northwest Regional Educational Laboratory 300 S.W. Sixth Ave. Portland, Oregon
7.	Non-print Materials Evaluation	P.E.I. Department of Education
8.	Nova Math A Journal for Teachers of Mathematics Vol. 1 No. 1	c/o Department of Mathematics Statistics & Computing Science Dalhousie University Halifax, N.S. B3H 4H8
9.	School MicroWare Evaluation Form	A Directory of Educational Software P.O. Box 246 Dresdon, Maine 04342

1. Creative Educational Services

Description: This evaluation form was developed by Gordon S. Wells at Creative Educational Services with the intention that it would be used as an initial assessment instrument that a single sheet of information would be derived from the data gathered.

These evaluation forms are accompanied with a complete guide to provide the evaluator with an outline of exactly what is expected in terms of evaluator responses for each of the criteria.

LESSONWARE EVALUATION FORM

Date ____________

CATALOGUE

PROGRAM NAME: ____________________ VERSION: ____________________

AUTHOR: ____________________

PUBLISHER: ____________________

ADDRESS: ____________________

CITY: ____________________ SUBJECT AREA: ________________

COST: ____________________ TOPIC: ________________

GRADE LEVEL (circle): K 1 2 3 4 5 6 7 8 9 10 11 12 13 N/A

INTENDED USER:

☐ TEACHER ☐ STUDENT ☐ PROGRAMMER ☐ OTHER (specify) ________________

SYSTEMS REQUIREMENTS

COMPUTER

☐ APPLE ☐ ATARI ☐ CEM ☐ COMMODORE ☐ RADIO SHACK ☐ OTHER (Specify) ________

Model: ________________

Required memory: ☐ 8K ☐ 16K ☐ 32K ☐ 48K ☐ 64K

PERIPHERALS REQUIRED

☐ Disk Drive ☐ 2 Disk Drives ☐ Cassette Player ☐ Paddles

☐ B/W Monitor ☐ Colour Monitior ☐ Light Pen ☐ TV Receiver

☐ Printer (specify model) ________________________________

☐ Card Reader (specify model) ________________________________

☐ Plotter (specify model) ________________________________

☐ Other (specify) ________________________________

SOFTWARE REQUIRED

☒ Language (specify version) ________________________________

☐ DOS (specify version) ________________________________

☐ Other (specify) ________________________________

DRAFT VERSION 1.0

OBJECTIVES

1. List the instructional objectives which are provided by the publisher.

2. Does this program respond to each of the instructional objectives identified by the publisher? ☐ YES ☐ NO

If 'no' explain

CURRICULUM

1. Identify the guideline(s) or related Ministry of Education document(s) to which this program is related.

2. To what course or program in each of the above guidelines does the lessonware apply?

3. What specific topics are dealt with in this program?

CONTENT

1. Are there examples of inaccurate subject content? ☐ YES ☐ NO

(Give all examples) ____

____

____

2. Were any errors found in:

a. punctuation .... ☐ YES ☐ NO
b. grammar .... ☐ YES ☐ NO
c. spelling .... ☐ YES ☐ NO
e. capitalization .... ☐ YES ☐ NO

Specify errors ____

____

____

3. Is the program free from:

a. racism .... ☐ YES ☐ NO
b. sexism .... ☐ YES ☐ NO
c. stereotypes .... ☐ YES ☐ NO
d. negative feedback .... ☐ YES ☐ NO

Specify ____

____

____

TEACHER OPTIONS

1. Does the program allow the teacher to:

a. enter or select alternate feedback to students ☐ YES ☐ NO
b. eliminate certain segments of the content ..... ☐ YES ☐ NO
c. add new materials to the program .... ☐ YES ☐ NO
d. impose or alter time limit on student .... ☐ YES ☐ NO
e. record or not record scores .... ☐ YES ☐ NO
f. disable sound, if applicable .... ☐ YES ☐ NO

INSTRUCTIONS

1. Do the instructions appear to be comprehensive and clear enough for students to use? ☐ YES ☐ NO

2. Will an orientation beyond that which is provided in the program and documentation be required by:

a. the teacher .... ☐ YES ☐ NO
b. the student .... ☐ YES ☐ NO

PROGRAM MODE

Drill and Practice

Instructional Game

Instructional Management

Instructional Support

Problem Solving

Simulation

Other (specify) ______________________________

Test Construction or Analysis

Tutorial

Programming Utility

Information

Research

Communications

PEDAGOGICAL FACTORS

1. Is more than one level of difficulty provided? ☐YES ☐NO

2. Is there a diagnostic or placement test in the program? ☐YES ☐NO

3. What is the anticipated time required by a pupil to complete the program? __________

4. Do you consider this method of presentation to be sound educationally? ☐YES ☐NO

5. Is this application better suited to another method of instruction? ☐YES ☐NO

   Explain ____
   ____
   ____

6. Is the grade level(s) indicated on page one appropriate for the user? (Indicate appropriate grade level on page one if this has not been done.) ☐YES ☐NO

   Explain ____
   ____
   ____

SUMMARY

1. I would use or recommend use of this package with little or no change. ☐ YES ☐ NO

2. I would use or recommend use of this package only if certain changes were made. ☐ YES ☐ NO

3. I would not use or recommend this package. ☐ YES ☐ NO

4. Describe the potential use of the package in classroom settings.

5. Describe major strengths of the package.

6. Describe major weaknesses of the package.

2. ECOO

Description: This form is used to record observations on microcomputer based educational software. Instructions for completing the form are included in it.

Reviewer's name(s)____________________

____

Reprinted in the ECOO Newsletter 2(2). June. 1981. Page 35.

Software Evaluation Form - 1517

81.01.28

Suggested use: Use this form for recording your observations on microcomputer-based educational software. Record the factual material, then make at least two runs through the material: the first to get the general feel of the material, then succeeding runs looking for particular features and problems. Record observations about particularly good, as well as bad, features. If you need more room, continue on plain paper, noting item number.

1. Program name: ____________________

2. Source of program: ____________________

3. Version
(or other identifying information): ____________________

4. Content field: ____________________

____

5 a) School population
(for whom suitable)____________________

b) Other population
(for whom suitable) ____________________

6. Computer required: Circle: APPLE COMPUCOLOR PET TRS-80

Other (specify) ____________________

b) Memory size required: ____________________

Peripherals required: ____________________

d) Optional peripherals ____________________

7. What features are required? Circle: Graphics Text Colour
Sound Output Speech Output

Other (specify)____________________

8. Summarize program in 100 words or less.

9. Indicate strategy used (circle all that apply):

Tutorial
Simulation
Game
Drill and practice
Problem solving

Explain:
Tool for the teacher ________________________
Tool for the student ________________________
Other ________________________

10. Cite particularly good or particularly bad aspects of the program with regard to the following areas of concern:

a) Objectives: Does program indicate what it is designed to do?

b) Instructions: Is it clear what the user is to do?

c) Output to the user: Is display used effectively?

d) Input: Does program resist user errors and recover gracefully?

e) Execution: Is program correct in content and performance?

f) Richness: Is task adequately rich for intemded audience?

g) Length: What time is the typical user likely to spend with this program?

h) Is the task appropriate for a computer?

i) What could be done to improve the program?

11. Summarize your evaluation in less than 100 words.

3. E.P.I.E. Institute
Educational Products Information Exchange

Description: In 1980, the E.P.I.E. Institute and the Microcomputer Resource Center began a joint project to analyze and evaluate instructional software for the microcomputer. The complete guide for evaluating is called "Defining Effective Microcomputer Courseware". This provides the teacher with complete instructional materials analysis: a description of the developer's rationale, learning objectives, content, methods, activities and the evaluation and management system built into the software. In addition it looks at specific instructional strategies which should be employed to facilitate instruction. The following analyst form is only a sample of one of the first of many courseware analyses and evaluations from E.P.I.E.

Analyst Name ______________________________ Date ______________ 19____

I. IDENTIFICATION AND BACKGROUND

A. Bibliographic Information

1. Title: ______________________________
2. Authors: ______________________________
3. Manufacturer or Publisher: ______________________________
4. Address: ______________________________
5. Copyright Date(s) (if no date, specify): ______________________________
6. Cost: ______________________________
7. Available for what microcomputer(s) (model and memory): ______________________________

____

B. Components

A Teacher's Guide for the whole program ____ is included

____ is not included

Grade Level	Title	Cassette	Disk	Module	Separate Tchr's Guide

*Indicates not available for analysis

Copyright © 1981 by EPIE Institute

Developed by Vicki L. Blum

C Support Related Materials

Give title, type of medium (print, video, audio cassette, film, etc.), producer/source, and role they play in the program.

Title	Medium	Producer	Role in program (e.g., required or supplementary

D. Program Application

1. Subject Area(s):____________________

2. Curriculum Role: ____ Supplementary/Adjunct
____ Basic Course/Mainline
____ Management Only
____ Other____________________

3. Mode of interaction (check as many as apply):
____ Drill and practice
____ Tutorial
____ Gaming
____ Simulation
____ Problem Solving
____ Exploration

E. Program Users

1. Intended Users: ____________________
____ Specified in materials
____ Specified in Teacher's Guide
____ Inferred

2. Learner Entry Competencies:____________________
____ No special competencies required
____ Competencies required but not specified
____ Special competencies specified in:____________________
____

II. INTENTS

A. Developer's Rationale

1. ____ Specified by developer ____ Inferred by analyst

2. Source: ______________________________

Rationale: ______________________ (Check as many as apply):

____

______________________ ____ Develop skills in particular area

______________________ ____ Present concepts and principles

______________________ ____ Supplement other resources

______________________ ____ Apply specific instructional approach

______________________ ____ Serve special group of learners

______________________ ____ Introduce subject matter content in a unique or specific way.

____

______________________ ____ Other: ______________________

B. Learner Objectives

1. ____ Specified by developer ____ Inferred by analyst

Source: ______________________________

2. Example of Objectives: ______________ Major emphasis of objectives are: (Check as many as apply):

____

____

______________________ ____ Recall of previously learned facts

______________________ ____ Application of specific skill(s)

______________________ ____ Abstraction beyond concrete level

______________________ ____ Transfer of learning (i.e., to real life situations)

____

______________________ ____ Critical thinking skills

______________________ ____ Create specific feelings and attitudes

____

______________________ ____ Develop study skills

______________________ ____ Other: ______________________

C. Instructional Strategies

	Always Present	Sometimes Present	Never Present
1. Objectives are stated behaviorally. Comments: ______________________	____	____	____
2. Objectives are stated in terms of the learner. Comments: ______________________	____	____	____
3. Objectives include higher order skills such as comprehension, application, analysis, synthesis, and evaluation. Comments: ______________________	____	____	____
4. Learners are informed of the objectives. Comments: ______________________	____	____	____

A. Content Scope

1. Topics Covered (list main topic(s), theme(s), units covered): ____________________

____

	Yes	No
2. Range of content material is adequate to achieve program's intents.	____	____
3. Scope is appropriate for learning levels of intended users.	____	____

B. Content Sequence

1. ____ Specified by developer ____ Inferred by analyst

2. Source: ____ Documentation ____ Teacher's Manual

____ Catalogue ____ Other: ____________________

If specified, briefly describe sequence of content: ____________________

____

____

3. Total program sequence:

Comments: ____________________

(Check as many as apply)

____ Chronological
____ Unit (natural unit in subject matter)
____ Problem-centered
____ Descriptive
____ Task Analysis (breaking task into parts and teaching progressively harder steps)
____ Dictated by learning approach (i.e., simulation, game)
____ Other ____________________

4. Student sequence through the total program:

Comments: ____________________

	Yes	No
Is set by program	___	___
Is set by teacher	___	___
Is left to user	___	___

5. Students' entry into and out of an activity:

Comments: ____________________

Is fixed by program in set sequence and user must continue through whole sequence	___	___
Can be varied by user	___	___
Can be varied by teacher	___	___

C. Preinstructional Strategies

	Always Present	Sometimes Present	Never Present
1. Pretests are used. Comments:______________________________ ____	___	___	___
2. Advanced organizers such as pre-questions, overviews, and summaries are used. Comments:______________________________ ____	___	___	___
3. Clear and concise title is presented at the beginning of each unit in the program. Comments:______________________________ ____	___	___	___

D. Instructional Strategies

Instructional Text Format:			
1. Information is formatted for easy reading. Comments:______________________________ ____	___	___	___
2. Labels or headings identify different kinds of information. Comments:______________________________ ____	___	___	___
3. Sentence structure is easily understood for user population (i.e., sentences aren't too long or too short). Comments:______________________________ ____	___	___	___
Concept Learning:			
4. The program uses a number of examples to teach each concept. Comments:______________________________ ____	___	___	___

	Always Present	Sometimes Present	Never Present
Concept Learning:			
5. The program uses a number of nonexamples to teach each concept.			
Comments:______________________	___	___	___
6. Practice in varied contexts is provided.			
Comments:______________________	___	___	___
Enhancing Retention:			
7. Vocabulary is appropriate for the user.			
Comments:______________________	___	___	___
8. When used, graphics are:			
a. embedded in the instuctional content (i.e., are an essential part of instruction)	___	___	___
b. used for enhancement only (i.e., are not part of the content but used to enhance presentation or feedback)	___	___	___
9. Graphics are used appropriately:			
a. are relevant for user's age and level	___	___	___
b. are not distracting	___	___	___
c. support program's intents	___	___	___
10. Cues and/or prompts are used after wrong response.			
Comments:______________________	___	___	___
11. Action occurs on the screen (i.e., there is graphic movement other than just words; specify if used in content, feedback only, or both).			
Comments:______________________	___	___	___
13. A demonstration of the exercise is given.			
Comments:______________________	___	___	___

IV. METHODOLOGY

A. Presentation

1. Methods for using the materials are:

_____ Specified by developer _____ Left to user ____ Left to Teacher

2. Source: _____ Teacher's Guide or instructional suggestions

_____ Directions in program _____ Other:___________________________

B. Instructional Approach

1. Briefly describe the instructional approach used in organizing the activities of this program (i.e., what does a teacher and student have to do to progress through a unit?).___________________________

____

____

____

____

____

____

____

C. Teacher Use

1. Teacher Training:

Comments:______________________________

____

_____ Is specified

_____ Is not mentioned

2. Teacher Use/Guidance:

Comments:______________________________

____

____

____

____

____

____

____

_____ Inservice Training

_____ Lesson plans in Teacher Guide

_____ General suggestions in Teacher's Guide

_____ No guidance provided

D. Teacher's Manual

1. _____ Is provided _____ Is not provided

2. Content provides:

Comments: ______________________________

	Yes	No
Enough information to familiarize teacher with technical use of program	___	___
Classroom strategies for use of program	___	___
Instructional activities to integrate program into curriculum	___	___

3. Instructions:

Comments: ______________________________

	Yes	No
Are well organized	___	___
Are clearly stated	___	___
Provide step-by-step approach	___	___

E. Instructional Strategies

	Always Present	Sometimes Present	Never Present
1. Instructions in the program for the student are easily understood. Comments: ______________________________	___	___	___
2. Instructions in the program for the student are concise. Comments: ______________________________	___	___	___
3. Please consider the extent to which the user can control the rate and sequence of presentation over:			
a. amount of time allowed for solving the problem (i.e., can user choose how many seconds each problem is presented)	___	___	___
b. rate that display material is presented so user can read information at own pace	___	___	___
c. choice of sequence so user is not confined to linear path	___	___	___
d. where entry into program must begin	___	___	___
e. exiting an activity at any time	___	___	___
f. reviewing instructions	___	___	___
g. options available in sequence such as "HELP," "HINT," "ESCAPE" keys	___	___	___

Comments: ______________________________

4. Guidelines for Evaluating Computerized Instructional Materials
Heck, William P.
Johson, Jerry
Kansky, Robert J.

Description: This software evaluation checklist was extracted from a larger report titled `Guidelines for Evaluating Computerized Instructional Materials'.

Other topics discussed in the report were:
a. Obtaining software and documentation
b. Guidelines for software review
c. Guidlelines for software documentation.

SOFTWARE EVALUATION CHECKLIST

PROGRAM NAME: ____________ SOURCE: ____________ COST: ____________
SUBJECT AREA: ____________ REVIEWER'S NAME: ____________ DATE: ____________

1. INSTRUCTIONAL RANGE

____________ grade level(s)
____________ ability level(s)

2. INSTRUCTIONAL GROUPING FOR PROGRAM USE

____ individual
____ small group (size: ____)
____ large group (size: ____)

3. EXECUTION TIME

________ minutes (estimated) for average use

4. PROGRAM USE(S)

____ drill or practice
____ tutorial
____ simulation
____ instructional gaming
____ problem solving
____ informational
____ other (____________)

5. USER ORIENTATION: INSTRUCTOR'S POINT OF VIEW

low				high	
•	•	•	•	•	flexibility
•	•	•	•	•	freedom from need to intervene or assist

6. USER ORIENTATION: STUDENT'S POINT OF VIEW

low				high	
•	•	•	•	•	quality of directions (clarity)
•	•	•	•	•	quality of output (content and tone)
•	•	•	•	•	quality of screen formatting
•	•	•	•	•	freedom from need for external information
•	•	•	•	•	freedom from disruption by system errors
•	•	•	•	•	simplicity of user input

7. CONTENT

low				high	
•	•	•	•	•	instructional focus
•	•	•	•	•	instructional significance
•	•	•	•	•	soundness or validity
•	•	•	•	•	compatibility with other materials used

8. MOTIVATION AND INSTRUCTIONAL STYLE

passive				active	
•	•	•	•	•	type of student involvement

low				high	
•	•	•	•	•	degree of student control

none	poor				good	
•	•	•	•	•	•	use of game format
•	•	•	•	•	•	use of still graphics
•	•	•	•	•	•	use of animation
•	•	•	•	•	•	use of color
•	•	•	•	•	•	use of voice input and output
•	•	•	•	•	•	use of nonvoice audio
•	•	•	•	•	•	use of light pen
•	•	•	•	•	•	use of ancillary materials
•	•	•	•	•	•	use of ____________

9. SOCIAL CHARACTERISTICS

present and negative	not present	present and positive	
____	____	____	competition
____	____	____	cooperation
____	____	____	humanizing of computer
____	____	____	moral issues or value judgments
____	____	____	summary of student performance

SAMPLE SOFTWARE DOCUMENTATION SHEET

PROGRAM NAME: ____________________

SUBJECT AREA: ____________________

PROGRAM CLASS

____ isolated program

____ part of a ____ program cluster

INTENDED AUDIENCE(S)

____ teachers

____ students in grade(s) ____________

____ other ____________________

____

PROGRAM USES: (1 = primary, 2 = secondary)

____ drill or practice

____ tutorial

____ simulation

____ instructional gaming

____ problem solving

____ informational

____ other ____________________

____

CRITICAL PREREQUISITE SKILLS

____

____

NAME(S) OF PREREQUISITE PROGRAM(S)

____

____

____

NAME(S) OF FOLLOW-UP PROGRAM(S)

____

____

____

DATE OF THIS DOCUMENTATION

____

PROGRAM SOURCE

name: ____________________

address: ____________________

____

____

phone: ____________________

program cost: ____________________

SYSTEM REQUIREMENTS

computer: ____________________

language: ____________________

memory needed: ____________ bytes

input mode: cassette

____-inch diskette

cartridge

other ____________

____

output mode: color monitor

B/W monitor

printer

plotter

other ____________

____

CLASSROOM VALIDATION (describe)

____

____

____

TIME FOR AVERAGE EXECUTION ____ minutes

OVER ➪

GENERAL DESCRIPTION OF THE PROGRAM (i.e., purpose of the program)

SPECIAL PROGRAM CHARACTERISTICS (e.g., use of graphics or sound, designed for use by groups of two or more persons at a time, level of difficulty can be modified by teacher (only) or student, exit from program is controlled by the teacher (only) or student, etc.)

DIRECTIONS FOR USE OF THE PROGRAM (e.g., directions not presented in the program itself but needed for program execution, directions regarding the use of the program within the total instructional process, notes regarding program options, etc.)

ANCILLARY MATERIALS REQUIRED (e.g., books, worksheets, charts, data lists, dice, geometric shapes, lab equipment, etc.)

ADDITIONAL DOCUMENTATION AVAILABLE (check box for each type)

☐ sample run (location ______________________________)

☐ program listing (location ______________________________)

5. JEM Research - Joint Educational Management Research

Description: The following three forms for evaluation of educational software were prepared by JEM Research in cooperation with the Ministry of Education British Columbia.

The first form is a summary of the evaluation format used for analysis of microcomputer-based instructional packages.

Form two is a courseware evaluation checklist which provides a quick and easy method for teachers to record important information about a program and to comment on the quality and features of a program.

The third form, `Student's Program Evaluation Form' is included for teachers to have a means of recording and assessing student's reactions to particular programs and to microcomputers in general.

I. JEM EVALUATION

Analysis of Microcomputer-based Instructioal Packages.

A. Identification

This will include such information as title, developer, publicati date, components, peripherals needed, language, cost, subject area user level, etc.

B. Purpose/Intent.

List the purposes (rationale for development) goals, objectives ( ) that the package is intended to achieve. (Identify instructional prerequisites.) (Note: if it is inferred say so.)

C. Content.

List the topics and/or skills covered. Include information suppli by supplementary components.

Describe the user control over sequencing, rate, amount, type and content of problem examples.

D. Structure.

Describe the instructional strategy used in the courseware. What is the role of the user? Is the package basic instructional materi or supplementary? Describe the flow or sequence of activity. How is feedback provided ? How much feedback is provided ?

E. Documentation.

Describe the nature of and level of specificity provided by the documentation.

F. Technical considerations.

Comment on suchaspects as clarity, visual appeal, use of graphics ease of use, level of instructions/directions , special features et

G. Readability/language level

Fog formula to be used or 'teacher judgement'. Include comments on level of concepts and idea load.

H. General Comment.

Identify strengths and weakness of program package. Comment on t degree to which the program achieves its goals. Comment on the ove 'elegance of the program.

I. Curriculum Match.

Comment on the degree of correlation with the B.C. Computer Science Course as well as the appropriateness for use with sen secondary school students.

II.

COURSEWARE EVALUATION CHECKLIST

Name of Program: ____________________
Name of Diskette: ____________________
Type of Program: ____________________
Subject Area: ____________________
Grade Level: ____________________
Peripheral: ____________________
Memory: ____________________
Source: ____________________

	yes	no	not relevant
1. The subject matter of this package is central to the field.			
2. The content is consistent with the goals and objectives of the established curriculum.			
3. Where appropriate, as in drill and practice, individualized instruction, remediation, or enrichment activities, there are diagnostic procedures built in.			
4. Evaluative procedures.			
5. Review procedures.			
6. A classroom management system.			
7. The program is one of a series in which a carefully planned sequence of learning objectives has been followed.			
8. The microcomputer is the best available method for presenting these materials.			

	yes	no	not relevant
9. The material is clearly and attractively packaged.			
10. Students enjoy using the program.			
11. The program will run right through without becoming "hung-up" because of unexpected response.			
12. The "escape" directions are repeated at timely intervals throughout the program.			
13. When the student is confused, help can be obtained.			
14. The student is not trapped in a situation where a repeated incorrect response results in the same question being repeated over and over again.			
15. Depending on the complexity or purpose of the program, the branching capabilities of the microcomputer are used when a student obviously shows that some tutoring or further information is required before proceeding.			
16. Feedback as to whether the student's response is correct or incorrect, is immediate.			
17. Positive reinforcement and encouragement are given intermittently.			

	yes	no	not relevant
18. Reinforcement is positive, appropriate, dignified and not time consuming.			
19. Directions are accompanied by useful examples where appropriate.			
20. The student can choose to see the directions again.			
21. Sound is used only when it is essential.			
22. Colour, graphics, and animation are used only when they enhance the lesson.			
23. Advantage is taken of the interactive capabilities of the microcomputer.			
24. Protocols of communication from the user to the computer are logical and unvarying.			
25. The student is never left with a blank screen and no indication of what is happening.			
26. The program ends with some suitable directions for the student.			
27. The program operates at the rate of the person sitting at the keyboard.			

	yes	no	not relevant
28. The material is appropriate for the target grade level in terms of prerequisite basic skills.			
29. Documentation is available.			
30. The text obeys the strictest rules for punctuation, capitalization, grammar, spelling and usage.			
31. Words and lines are spaced for ease of reading.			
32. The use of space on the entire screen in effective.			
33. Variation in type and organization of textual materials are appropriate for a clear presentation.			

Description and Comments:

III. Student's Program Evaluation Form

1. What is your name? ______________________________

2. How old are you? ________________________________

3. What grade are you in? _____________________________

4. In what subject area were you using the program?

   ____

5. What was the name of the program?

   ____

6. Were the directions easy to follow?________________

7. Were there any words you could not read?_____________

8. Were there any words you did not understand?_________

9. Were there any mathematics problems you thought were too difficult for your grade level? ___________________

10. Would you rather have done this lesson in some way other than by using the microcomputer? __________________

    ____

11. Did you enjoy the program?_________________________

12. Do you feel that you learned from it? ______________

13. What did you dislike about the program?_____________

6. MicroSIFT - Computer Technology Program

Description: This evaluation form was extracted from the evaluator's guide which was developed to provide background information and forms to aid teachers and other educators in evaluating educational software and courseware. The MicroSIFT guide is lengthy, (44 pages) and gives detailed descriptions for complete evaluation of courseware.

Excerpt from Evaluator's Guide developed by MicroSIFT,
a project of Computer Technology Program, NWREL,
300 S.W. Sixth Avenue, Portland, Oregon 97204.

Northwest Regional Educational Laboratory

Copyright 1981 NWREL

RATING: Circle the letter abbreviation which best reflects you judgment (use the space following each item for comments).

IMPORTANCE: Circle the letter which reflects you judgment of the relative importance of the item in this evaluation.

☐ Check this box if this evaluation is based partly on your observation of student use of this package.

	RATING					IMPORTANCE (OPT)		
	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable	Higher	Lower	
CONTENT	SA	A	D	SD	NA	H	L	1. The content is accurate.
	SA	A	D	SD	NA	H	L	2. The content has educational value.
	SA	A	D	SD	NA	H	L	3. The content is free of race, ethnic, sex, and other stereotypes.
INSTRUCTIONAL QUALITY	SA	A	D	SD	NA	H	L	4. The purpose of the package is well-defined.
	SA	A	D	SD	NA	H	L	5. The package achieves its defined purpose.
	SA	A	D	SD	NA	H	L	6. Presentation of content if clear and logical.
	SA	A	D	SD	NA	H	L	7. The level of difficulty is appropriate for the target audience.
	SA	A	D	SD	NA	H	L	8. Graphics/color/sound are used for appropriate instructional reasons.
	SA	A	D	SD	NA	H	L	9. Use of the package is motivational.
	SA	A	D	SD	NA	H	L	10. The package effectively stimulates student creativity.
	SA	A	D	SD	NA	H	L	11. Feedback on student responses is effectively employed.
	SA	A	S	SD	NA	H	L	12. The learner controls the rate and sequence of presentation and review.
	SA	A	D	SD	NA	H	L	13. Instruction is integrated with previous student experience.
	SA	A	D	SD	NA	H	L	14. Learning is generalizable to an appropriate range of situations.
TECHNICAL QUALITY	SA	A	D	SD	NA	H	L	15. The user support materials are comprehensive.
	SA	A	D	SD	NA	H	L	16. The user support materials are effective.
	SA	A	D	SD	NA	H	L	17. Information displays are effective.
	SA	A	D	SD	NA	H	L	18. Intended users can easily and independently operate the program.
	SA	A	D	SD	NA	H	L	19. Teachers can easily employ the package.
	SA	A	D	SD	NA	H	L	20. The program appropriately uses relevant computer capabilities.
	SA	A	D	SD	NA	H	L	21. The program is reliable in normal use.

22. CHECK ONE ONLY

____ I would use or recommend use of this package with little or no change.

____ I would use of recommend use of this package only if certain changes were made.

____ I would not use or recommend this package.

This work was devloped under contract #400-80-0105 with the National Institute of Education, U.S. Department of Education. However, the content does not necessarily reflect the position on policy of that agency, and no official endorcement of these materials should be inferred.

7. Non-print Materials Evaluation

Description: This evaluation form was developed by the Department of Education in P.E.I. for non-print materials.

P.E.I. DEPARTMENT OF EDUCATION

TITLE: ______________________ **COST:** __________

PRODUCER: ______________________ **YEAR:** __________

CURRICULUM AREA(S): ______________________ ☐ *stated* ☐ *implied* ☐ *left to user*

GRADE(S): ______________________ ☐ *stated* ☐ *implied* ☐ *left to user*

TYPE OF MATERIALS: ☐ *16mm film* ☐ *filmstrip* ☐ *slides* ☐ *video tape* ☐ *overheads* ☐ *photo prints* ☐ *records* ☐ *audio tapes* ☐ *other* ______________________

TIME __________

OBJECTIVE: (Educational purpose) ☐ *stated* ☐ *implied* ☐ *left to user*

CONTENT SUMMARY: (Describe materials, production style & treatment.)

- ☐ *photographs*
- ☐ *drawings*
- ☐ *diagrams/graphs*
- ☐ *animation*
- ☐ *live action*
- ☐ *cartoons*
- ☐ *special effects*

	EXCELLENT	*GOOD*	*POOR*
APPROPRIATENESS: (Relation to subject, objectives and mode)	☐	☐	☐
SOPHISTICATION: (Suitable for age, previous experience, intelligence)	☐	☐	☐
CONTENT: (Accurate; impartial; up-to-date; balanced)	☐	☐	☐
ORGANIZATION: (Logical; clear; orderly treatment of subject)	☐	☐	☐
INTEREST LEVEL: (Stimulation; imagination; sensory appeal)	☐	☐	☐
TECHNICAL QUALITY: (Picture; sound; clarity; technique)	☐	☐	☐
SPECIAL FEATURES: (Notes; guides; accompanying material)	☐	☐	☐

(OVER)

DESCRIBE POSSIBLE USES: ☐ *stated* ☐ *implied* ☐ *left to user*

(Check off all potential uses.)

- ☐ *introduce/overview*
- ☐ *present information*
- ☐ *build motivation/interest*
- ☐ *aid concept formation*
- ☐ *aid problem solving*
- ☐ *provide skills/drill*
- ☐ *review/culminating activity*
- ☐ *appreciation*
- ☐ *values clarification*
- ☐ *other* ____________________

Comments:

OVERALL CRITIQUE: (Strong & weak points, special features, etc. If necessary, explain content ratings from previous page.)

OVERALL RATING: ☐ *excellent* ☐ *good* ☐ *poor*

PURCHASE RECOMMENDATION: ☐ *yes* ☐ *no*

EVALUATOR: ______________________________ **DATE:** ______________

8. Nova Math - A Journal for teachers of mathematics

Description: This computer package evaluation guide was taken from the Journal, Nova Math. The journal's expected audience is primarily the teachers of mathematics at the high school level. One topic they emphasize is the understanding and use of microcomputers in the classroom with a hope that Nova math will be able to serve as a central clearinghouse for information on microcomputers. Nova Math included this evaluation guide as an aid for teachers interested in computer software for the classroom.

NOVA MATH

COMPUTER PACKAGE EVALUATION GUIDELINES

I DO/ DO NOT recommend this package.

Reviewer's Name____

Address____

____

Date____________________________

Please fill out as much of this form as you feel is appropriate.
(Attach additional sheets if necessary)

A. GENERAL INFORMATION

Package Name____

Supplier:Name____

Address____

____

Subject area__________________________Grade__________

Machine requirements: Model______________________________

Memory size______________________________

Language used____

Estimated execution time________________________________

Package use(s):____drill and practice,____problem solving

____game,____simulation,____tutorial,

____remediation,____enrichment,____management,

____diagnostic,____other

Instructional Grouping:____individual,_____small group(size)

____large group(size)

B. SYNOPSIS: Briefly describe how you as a teacher use this package in your classroom and whether the students benefit.

C. STUDENT-PROGRAM INTERFACE

1. Program provides for different degrees of difficulty. Yes No
2. Student user controls level of difficulty. Yes No
3. Program can respond to wrong typing entries. Yes No
4. User performance is reported to: user Yes No
   teacher Yes No
5. How many wrong answers does the program allow?____________

	very good	good	average	poor	disastrous	not applicable
6. Program responds appropriately if user needs help.						
7. Screen displays are effective.						
8. Special features used well: graphics						
sound						
colour						
9. Program provides effective and appropriately clear responses.						
10. Program operates reliably and is free of errors.						
11. Teacher able to intercede and assist student use of package.						
D. ACCOMPANYING LITERATURE INCLUDES:						
1. Prerequisites needed by the student user.						
2. How to use the program.						
3. Sufficient sample runs to cover most possibilities.						
4. A list of materials needed to use the program.						
5. Suggestions about how and when to integrate the package into a unit.						
6. Student exercises and answers.						
7. References to topics for further study and follow-up activities.						
8. References to standard texts.						
9. Information about the limitations of the program(s).						

9. School MicroWare Evaluation Form

Description: The school MicroWare Evaluation form was developed by the editor to aid teachers in evaluating software quality. Instructions for the use of the form are included in it. They have found that it takes from 30 minutes to an hour to do a complete evaluation of one program.

SCHOOL MICROWARE EVALUATION FORM

(This form may be copied as needed; for additional information, see School MicroWare Vol. 1 No. 1)

Your Name____________________Organization____________________Position__________

Product Name________________Supplier____________________No. of Progs. Under This Name______Price $________

Applicable School Dept/Subj/Topic ____

INSTRUCTIONS - For open ended items, supply all information requested in blanks provided if possible; use extra sheets if necessary. For objective items (those with blanks to left), enter a number in the blank to indicate the extent to which the program fulfills the description in the item, as follows: 2 - Completely, 1 - Partially, 0 - Not at All. If the item is not applicable to the program, enter N/A. If the item is unclear, enter U. Elaborate on answers as necessary in Comments section at end or on extra sheets, giving item numbers.

OVERVIEW - Describe the program briefly in terms of its goals and what it does to achieve them (no evaluation here).

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PRELIMINARY CONSIDERATION - Assuming that this program contributes to the teaching of one or more topics, is that topic one which is or should be taught in today's schools? Yes No If not, give your reasons for this answer in the Comments section at the end of the form and omit the balance of the questionnaire.

DOCUMENTATION - List materials accompanying the program, e.g., teachers guide, student workbook.

1. Indicate types of information included.
   - ----- a. Suggested course/subject, grade levels.
   - ----- b. Goals.
   - ----- c. Performance objectives.
   - ----- d. Suggested teaching strateg(ies).
   - ----- e. Correlation with standard texts.
   - ----- f. Prerequisites for use of program.
   - ----- g. Student exercises, teacher answers.
   - ----- h. Operating instructions.
   - ----- i. Listing and sample runs of program(s).
   - ----- j. If a simulation, description of the model used.
   - ----- k. Suggested topics for follow-up discussions.
   - ----- l. Suggested references/activities for follow-up.
2. ----- The documentation is written clearly.
3. ----- If a workbook is included, the format and content are appropriate.

INSTRUCTIONS GIVEN TO USER BY PROGRAM

1. The instructions are adequate regarding:
   - ----- a. The instructional task to be performed.
   - ----- b. Details of how to interact with the program.
2. ----- User has the option of skipping instructions if already known.

STUDENT-COMPUTER DIALOG

1. ----- Output is displayed screen by screen (paged) rather than scrolled.
2. If output is paged:
   - ----- a. User has control over continuing to the next page.
   - ----- b. Amount of information in each page is appropriate.
   - ----- c. The perceptual impact (amount of type and lines) is suitable.
3. ----- Output is spaced and formatted so as to be easily readable.
4. ----- Language is well suited to most students' reading ability.
5. ----- Uses correct grammar, spelling, hyphenation and punctuation.
6. ----- Any grid or coordinate system used is consistent with common conventions.
7. ----- Students can respond with common symbols & ways of using them, e.g., right to left entry of sums.
8. ----- Accepts abbreviations for common responses.
9. ----- Provides for individual needs, e.g., opportunity to work with harder or easier material.
10. ----- Dialog is personalized, i.e., makes appropriate use of student names.
11. ----- Uses devices to get & maintain interest, e.g., variation of computer responses, humor, pace change, surprise.
12. Makes good use of any special features of computer:
    - ----- a. Graphics
    - ----- b. Color
    - ----- c. Sound
13. ----- Reinforcing responses (indications of right, wrong, etc.) are appropriate.
14. ----- The number of wrong answers allowed is reasonable.
15. ----- Responds appropriately if allowed number of wrong answers is exceeded.
16. ----- Provides opportunity to get help if difficulty is encountered.
17. ----- Minimizes bad entries via devices such as objective formats (multiple choice,etc).
18. ----- Deals well with inappropriate entries, i.e., response to typing errors, etc., is intelligible and useful.
19. ----- Required entries are within students' capabilities (esp. typing, vocabulary).
20. ----- Reports student performance periodically and at end of session.

MISCELLANEOUS CONCERNS

1. ----- If a simulation, the program gives a sufficiently accurate representation of the situation simulated.
2. ----- The concepts and vocabulary required to use the program are reasonable.
3. ----- Operates properly and is free of bugs.
4. ----- Is well structured and documented internally to facilitate any necessary debugging/modification.

COMMENTS - Please use this space and additional sheets as necessary to provide any other information which you believe would help someone who was considering acquiring the program being reviewed. In particular, indicate what you like least and most about the program. Also, list any changes which should be made.)

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B) ARTICLES ON EVALUATION OF EDUCATIONAL SOFTWARE

1. "Evaluating Educational Software", Kleiman, Glenn. Humphrey, Mary M. Buskirk, Trudy Van.
   Creative Computing. March, 81. pp. 85-90

2. "How to Evaluate Educational Courseware", Hakansson, Joyce.
   The Journal of Courseware Review, Vol. 1. No. 1.

3. "Identifying Good Computer Courseware", Crowley, Mary L.
   Nova Math. Vol. 1 No. 1. pp. 39-43

4. "Softswap: The Evaluation and Dissemination of Non-commercial Teacher Created Software", Lathrop, Ann.
   AEDS-81 Convention Proceedings, Minn. May 5-8. pp. 173-175.

5. "Software Review", Jostad, Karen.
   The MECC Instructional Computing Newsletter. March 82. Vol III. No.4

Photos courtesy Morristown Daily Record.

Glenn Kleiman Mary M. Humphrey Trudy Van Buskirk

EVALUATING EDUCATIONAL SOFTWARE

Educators are rapidly becoming aware of the potential of microcomputers. Currently available, relatively inexpensive, computer hardware is capable of providing powerful and flexible tools for teaching. Computers can be used to individualize instruction, maximize children's attention and present material in new ways through the use of graphics and simulations. Computers can be tutors that provide appropriate levels of instructions and questions for each individual. They can provide immediate feedback to students' answers, and they are infinitely patient. They can also keep detailed records of each student's performance.

Unfortunately, much of this potential remains unfulfilled. By itself, a computer is a dormant set of electronic components. No matter how potentially powerful, the usefulness of a computer is determined by the software available for it.

The development of educational software lags far behind the development of hardware. Many of the available programs are poorly designed, do not take advantage of the potential of computers, and are difficult for students and teachers to use. We fear that the use of poor software will discourage some educators from using computers at all.

Some good educational software is available, and much more should be available in the near future. Our aim in this article is to present guidelines for selecting good software. We will discuss the general principles that we, as educators, psychologists and computer specialists, believe should form a basis for both software development and software evaluation.

Since we will focus on general principles rather than specifics, what we have to say is relevant to a wide variety of teaching programs, topics, students, and computer systems. The guidelines are presented as questions one should ask about any computer software designed for educational use.

First we will discuss three very general questions. Then we will turn to more specific questions that are based upon the three general ones.

One general question is: *Does the software follow good educational practices?* Much of the available educational software seems to have been written by computer programmers who do not know much about education or the abilities of the children who might use the program. Such software may be of high quality from a programming point of view, but it often contains serious flaws from a pedagogical point of view.

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Mary M. Humphrey, and Trudy Van Buskirk, Ontario Institute for Studies in Education, Toronto, Ontario, Canada.

For example, educationally well-designed programs present material in small, well-sequenced units. We have seen many programs that present too much material at one time, and present it in ways that may be confusing to many children.

Another good educational practice is to provide immediate feedback when the student makes a response. Computers can be programmed to do so, but many programs do not take advantage of this capability.

Other programs make poor use of the graphics capabilities of computers. A common fault is using graphics in ways that distract the child from the material to be learned.

Another general question is: *Is the software suitable for the intended purposes and users?* Some educational software does not present a reasonable progression of material to be learned and therefore will not fit into any curriculum.

Other computer programs are not acceptable because they are difficult for students and teachers to use. Many lack adequate instructions, do not take into account the reading level of the intended users, require complicated procedures to enter answers, or stop operating if the user makes an inappropriate response.

The remaining general question is: *Does the software take advantage of the capabilities of the computer?* The major reason for using computers as educational tools is that you can do things with computers that cannot be done, or are much more difficult to do, without them. However, computer programs often do not take advantage of the capabilities of the computer.

For example, we consider programs that are basically written pages moved onto the computer screen, in which the computer simply acts to turn the pages, to be a waste of computer resources. Some lessons are better presented with other media. Since most schools do not have an abundance of computers, the available computers should be used for those types of lessons for which they offer strong advantages.

We now turn to the more specific questions, each of which reflects one or more of these general concerns.

Does the Program Fulfill Its Purpose?

Computers can be used in teaching a wide variety of topics, and one must decide whether a given program fits into the curriculum being used. Once a match between the curriculum and a software package has been found, there are several other considerations regarding the role of the computer.

One must decide whether the computer will be used in the initial teaching of the material, for review or practice, for testing, for record keeping, for facilitating general skills, or for some combination of these functions.

Deciding which of these purposes one wants a given program to serve is an important step in evaluating the potential usefulness of the program.

Computers can be helpful in the initial teaching of material. For example, computer graphics and animation can provide useful visual aids. In some cases, computers can substitute for the teacher and textbook and actually teach the material.

Another possible role for the computer is to review lessons or present drill and practice. Since they are infinitely patient, computers can be especially useful for those students who need more repetition. Programs can be written to ask the student questions and give feedback when he answers.

Since computers can keep track of students' performance, they can also serve in testing and in record keeping. Well designed testing programs allow the teacher to enter questions and acceptable answers. Various criteria can then be set to individualize the test for each student. For example, programs can be designed to vary the difficulty of the questions presented depending on how many the student has answered correctly. With a printer, connected to the computer, written records can be produced automatically.

Does the program use sounds or graphics that might distract other children in the room?

In addition to helping children learn and master specific material, computers can be important in facilitating general skills. For example, many computer games provide good practice in eye-hand coordination, making rapid responses, and maintaining attention. Other computer games exercise general problem solving and creative skills.

Is the Software Appropriate for the Situation In Which It Will Be Used?

When evaluating software, one should keep in mind where and when it will be used. Will an adult be present to assist the student, or should the student be able to use the program without assistance? Will children work individually or in groups?

If they will work in groups, one should consider whether the program is designed so that children can share the work or alternate entering responses.

How often will each child use the program, and for how long? If a program is very repetitious, it might be suitable if it will be used only occasionally and briefly.

If a program is fairly complicated and will take a while to learn to use, it will be suitable only if sufficient computer time is available. Finally, will it be used in the classroom and, if so, does it use sounds or graphics that might distract other children in the room?

Is the Software Suitable for the Intended Users?

As we mentioned above, much of the available educational software seems to have been produced by computer programmers who know little about the children who might use the programs. One important area of concern is the instructions provided with the program.

Many educational programs do not provide adequate instructions. Often the instructions designed for the child are unsuitable because of the reading level required. For example, we have seen instructions requiring high school level reading in math programs designed for grade school children.

Many programs also fail to provide adequate intructions for the teacher on how best to use the program. In several programs, we have happened upon useful features that were never mentioned in the instructions.

Another important concern is how the user makes responses. There are many ways in which information can be entered into a computer. The most common ones use typewriter or calculator style keyboards. Young children can usually use these to enter single letter or digit answers. However, entering entire words or sets of words may be too difficult for young children.

Other input devices can be attached to computers. Light pens enable responses to be made by pointing at a particular part of the screen. Using a light pen, a child can answer multiple choice questions without needing to find the appropriate keys on the keyboard.

Other devices, such as joysticks and game paddles, also provide easy ways of making responses.

The pacing of the material being presented should also be considered. In some programs it is completely controlled by the computer. In other programs the material is presented in small units and the user presses a key to advance to the next unit. Since different children work at different rates, we generally prefer programs where the pacing is controlled by the user. The main exceptions are programs used to increase speed, such as in rapid word recognition. Even in these programs, there should be a range of speeds available so they can be used with a variety of children.

Does the Software Adapt the Computer to the User or Must the User Adapt to the Computer?

A very important consideration, often neglected by programmers, is whether the students and teachers will be able to use the program easily and comfortably. Psychologists call this area human factors—considering the people, not the machines.

Most addition programs provide examples of programmers' failure to adapt the computer to the user. When children do addition problems with paper and pencil, the addends are usually written one below the other, with the columns in line. The children work the problem from right to left, and mark carrying from one column at the top of the next.

Many addition programs present the problems with the addends side by side, require the answers to be entered from left to right, and do not provide any way of marking carrying. In using these programs, children often copy the problem, work it on paper, and then enter their answer into the computer.

Programs that present problems this way force the user to adapt to the computer. With more effort on the part of the programmer, the computer could have been adapted to the user.

Other examples of failing to adapt the computer to the user include using "*" instead of "x" to indicate multiplication, not providing any way in which mistakes can be erased, and filling the screen with so much information that it is difficult to read.

Another thing that makes programs difficult to use is lack of consistency. One should check whether the way information is entered is consistent within the program, and, if possible, is consistent with other programs the children might use. For example, on the PET computer a key marked DEL (for delete) is usually used to erase responses. A program that uses some other key, or does not allow erasing, or only allows erasing some of the time, may confuse children who are acccustomed to using the DEL key.

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SANDY

"I'd get more work done if it would pause for commercials."

We hope that educational programmers will agree to a set of standard input procedures in the near future. As things stand now, educators should look for sets of programs that operate in similar ways.

Another problem good programmers should consider is that users do not always make the expected response. For example, given a choice of pressing "Y" for yes or "N" for no, an uncertain child might press "M" for maybe. Children often press keys just to see what will happen, and we have observed children pressing an "Erase" key to try to erase a difficult question. Good programs are prepared for inappropriate responses, so that these responses will either be ignored or result in a message such as "try again."

> ***Given a choice of pressing "Y" for yes or "N" for no, an uncertain child might press "M" for maybe.***

Poor programs are not child proof and may "crash" when inappropriate responses are made. When testing any program, one should make sure that inappropriate responses will not disrupt the program.

Does the Software Take Advantage of the Capabilities of the Computer in Presenting the Lessons?

Many lessons, creatively designed, can take good advantage of the graphics and sound capabilities of the computer. Any lesson where animation or interactive graphics can be useful is better presented on a computer than a book.

For example, many lessons in physics, such as those on wave forms or vectors, can benefit from animated representation of the phenomenon being studied.

Other examples include programs that produce maps and point to them during lessons, programs in which graphs are produced and revised to support the information presented, and programs which enable the user to, in some way, draw on the screen.

Other lessons, such as those in music, can take advantage of sound generation capabilities—the student can both see the note on the screen and hear it, different sequences can be played, and so on.

In addition to using the built-in capabilities, other devices can be interfaced to computers. Sound can be easily and inexpensively added to computers that do not have it built-in. Interfaces have been designed to enable computers to control tape recorders, slide projectors, and video recorders. We hope to see greater educational use of computers controlling these presentation devices.

Is the Program Adaptable to Different Children and Teaching Methods?

A good educational program can be easily adapted for different users. For example, a program that can only present 10 addition problems, with each problem having two addends and two digits per addend, is very poor. A program that allows you to specify the number of problems you want is a small bit better. A program that allows you to set different difficulty levels for the problems as well as the number of problems is much better. A program that also gives you the option of using subtraction, multiplication or division problems is better still. The lack of this type of flexibility is one of our most common criticisms of available programs.

Some software companies market a large package of programs where one flexible program would serve the same purpose and be much less expensive.

For example, one company sells sets of 24 spelling programs. Each program contains a small number of words, and the only differences among the programs is in the word lists. It would not be difficult to write a similar program in which the teacher could input his own spelling words. This program could sell for a fraction of the price of the large package.

When obtaining flexible programs, one must be careful that they are easy to modify. Some provide a simple "menu," from which the user selects the desired options by pressing one or two keys. Menus are very easy to use. Other programs require the user to change the program itself, usually by modifying DATA statements or changing the values assigned to certain variables.

Will the Program Hold the User's Attention?

Another important question is whether the program will capture and hold the user's attention. Properly designed educational programs have been successful in keeping even the most distractible children engaged in a task for surprisingly long periods of time (see "Microcomputers and Hyperactive Children" by Kleiman, Humphrey and Lindsay in *Creative Computing*, March, 1981).

The graphics and sound capabilities of microcomputers, properly used, can hold children's attention. Improperly used graphics and sound can quickly become annoying and discourage use of the program. When examining these aspects of a program you should determine not just whether they are initially captivating, but whether they will remain so with repetition.

For example, a program that displays a rocket ship slowly rising on the screen, or plays a melody after each correct answer, might be initially motivating. However, after one has seen or heard this ten times it will probably become tiresome. We find that graphic and sound reinforcement which is used repeatedly should be rapid (i.e., two to three seconds) and varied. Different pictures or tunes hold attention much better than the same one or two repeated frequently.

The pacing of the program and the frequency of user responses also affect how well it holds children's attention. A program in which the child has to wait long periods, or which moves more quickly than the child can read or give answers, will not hold the child's attention. Likewise, the more frequently the child must make a response, rather than simply watch the screen, the more likely he will stay engaged in the program. Receiving immediate feedback to their responses also helps hold children's attention.

In many cases, educational material can be presented in a game format. We do not believe that all educational programs need to be forced into games. However, the competitive nature of games often does hold children's attention. The competition can either be against one's own prior performance, against the computer, or against another person.

Game programs should be checked to make sure the children will be able to play reasonably well, but still find the game challenging. A game which is too simple or too difficult will not keep one's interest. The best game programs allow the user to set the level of play—e.g., present the older or more capable users with more difficult questions or less time to perform the task.

A good computer program—particularly one designed for use by children with concentration problems—can monitor the child's responses and provide special messages. For example, the program can measure the time between the user's responses, and flash a special message or sound a buzzer if there is no response for a long time. We have not found many programs that do this, but we have found it useful in our research.

Does the Software Provide Useful Feedback to the User?

One of the major advantages of computer-based learning over other media is the capability of immediate feedback. As we mentioned above, immediate and frequent feedback helps keep childrens' attention on the task at hand, and this is especially important for children with attention problems. The right feedback at the right time is also important for facilitating learning.

Besides the motivating reinforcers for correct responses, an important aspect of a program is how it responds to incorrect responses. One poor but common type of response is simply to tell the child that he is wrong, and go on to the next part of the program. Some programs, written without any thought about who might use them, even display insulting messages after a wrong response. Messages from a computer such as "Wrong, Dummy" may be humorous to some adults, but can upset young children.

> ***Messages from a computer such as "Wrong, Dummy" may be humorous to some adults, but can upset young children.***

One good practice is to provide the child with a second chance when an incorrect response is made. For some purposes, this is best combined with a prompt of some sort. For example, a spelling program might tell the child which letters are incorrect, and then have him try to spell the word again. In programs where the questions are based on an immediately preceeding lesson, the appropriate section of the lesson might be repeated when the child does not answer a question correctly.

Another alternative is to give the child the correct answer. Depending on the content of the lesson, this may be best after a single incorrect response, or it may be better to give the child several tries before giving the correct response. In either case, a good practice is to provide some way for the child to compare his answer with the correct one, or to spend some time studying the correct one.

For example, in spelling programs the child should have to type the word correctly after being shown the correct spelling. Another good practice is for the program to store a record of the questions or problems the child answered incorrectly. These can be repeated later on, or given to the child at the end of the lesson for further study.

We have seen programs where the most interesting graphics and sound displays occurred in response to incorrect answers. These programs should be avoided, as they encourage children to make incorrect responses just to see what happens.

Other programs are designed to accept only the correct response. For example, some math programs will not let any but the correct number appear on the screen—if the child presses an incorrect number nothing happens. Faced with this type of program, some children just press all possible keys until they happen to hit the correct one, without paying any attention to the math problem. Clearly, this is not a recommended practice.

Conclusions

We have discussed several questions to be asked when evaluating educational software. All of them reflect three general requirements for quality educational software: 1) It must follow good educational practices; 2) It must be suitable for the intended purposes and users; and 3) It must take advantage of the unique capabilities of computers. Within these three general guidelines, which of the specific questions is most important depends upon the material being taught, the teaching method, the students' abilities, the available computer hardware, and other factors specific to each situation.

We hope this article will help teachers, educational administrators, and parents choose the best available educational software. We also hope it will encourage and facilitate the writing of good educational programs. □

"We at electronic gadgets feel the Minnie Mouse® *style CRT is less intimidating for the younger or the timid child."*

How to Evaluate Educational Courseware

Joyce Hakansson

Judge a computer program as you would any other educational material.

The advent of educational microcomputer technology has loomed as a threat to educators and administrators alike. Parents expect teachers to be instant experts; knowledgeable in the use of computer-assisted instruction (CAI), courseware development, and classroom application. The fact is that educators have the skills and expertise to absorb this new technology. The computer is a new delivery system, and its value is dependent on the quality of instruction it delivers. Using the author's suggested questions as guidelines, it is possible to develop a "critical eye" when reviewing educational software.

As a variety of "educational" microcomputer programs reach the marketplace, educators and administrators must become instantly informed computer-software experts. Educators with tight budgets and little computer experience are being asked to evaluate and purchase programs for school microcomputers. These individuals are finding many questions to be addressed, from "where to look for available software" to "how to decide which of the available programs to purchase." This article is intended to provide some help with the first question and to provide a few basic guidelines to assist with the second. The proposed evaluation tools are very informal, primarily a series of questions to ask when considering the purchase of a program.

Does the Program Run?

It is to be hoped that this question will soon be removed from the list, but right now it must be the starting point for any evaluation. When the program is loaded into your computer, does it proceed from beginning to end? Try answering some questions with "wrong" answers; press some keys that students might press by mistake (zero for O, 1 for L) and see how the program reacts. Ideally, it should help the user when a mistake is made or should wait for entry of another answer. It should not freeze or stop running.

Is the Program Easy to Use?

The program should be consistent in the way it gives and receives information. A well-designed program uses and reinforces conventions that transfer to the standards used in other academic disciplines. For example, the program should indicate how the user is to signal the computer that s/he has responsed to a question and that the user wants to proceed. Some programs prompt the student to "press any key to proceed"; others just proceed automatically when a key has been pressed. Some advance automatically after a certain period of time elapses, still others prompt "press return to continue," and some do all of the above at various times throughout the program. The programmer should use a consistent format and ask for only one of the above responses whenever the user wishes to proceed.

The popular choice is to use "press return . . ." because this convention conforms to the format used in computer programming. In the same way, when coordinates are introduced, the labeling of points, such as x, y, etc., ought to conform to the techniques used by mathematicians. Instructions or other text ought to use correct grammar, words should be spelled correctly, and sentences should be punctuated. (There is an extensive research project, MICROSIFT in Portland, Oregon, that is currently developing a formal tool for educational computer programs.)

Is the Activity Educationally Sound?

Judge a computer program just as you would any other educational material. Do not let the technology overwhelm or distract you. Trust your own judgment. The computer is a delivery system, and its value in this setting is dependent on the quality of the program it is presenting. Some of the specific questions to be asked about the program are:

a) Is the presented activity appropriate to and integrated into the concepts to be taught?
b) Is the activity appropriate for the age of the student user?
c) Are the called-for responses reasonable tasks for this user?
d) Does the computer enhance this activity, or is the activity more suited to another medium, such as print or film?
e) Is the program attractive and interesting?

Who is in Control— Student or Machine?

Programs ought to be constructed so as to put the student in control of the machine, not vice versa. When text appears, the student should have control of the length of time it stays on the screen. The student should have as much time as needed to read and understand the information. When ready, the student can make the machine continue by pressing the return key. The alternative is to have the computer continue at a predetermined pace, whether the student is ready or not. Allowing the person to pace the lesson individualizes the program and adjusts for differences in speed of reading and comprehension. It also provides the student with a sense that the computer is a tool providing information rather than a taskmaster.

Does the Program Present the Concept to be Learned in a Harmonious and Well-Balanced Way?

A computer can deliver information in a variety of ways. The most common are through text printed on the screen, graphics, and sound. Each of these elements in a program should support and reinforce each other and should help the student focus on and understand the educational purpose of the program. Printed text must be presented so as to be easy to read. Within the limits of the technology, it should be placed on the screen in such a way as to attract the student's attention and quickly convey the needed information.

The graphics should support and reinforce the learning that is the purpose of the program. All too often, a colorful graphics display is introduced to "reward" the learner for a correct response but has no relationship to the learning that has taken place. In this situation, the graphics quickly become distracting and get in the student's way, diverting attention from the real purpose of the program.

Sound, too, can, if not used in harmony with the other parts of the program, distract rather than add to the learning process. Sound can provide clues to the learner, call attention to the screen, and can, when used well, provide a very powerful addition to the computer's ability to teach.

The important thing to look for is a well-balanced program that guides a student successfully through a learning experience, utilizing all the capabilities of the machine in a harmonious blend. Devising good computer programs is a creative art as well as an intellectual skill. Evaluating software, therefore, depends upon developing a "critical eye" through experience in using programs and observing how students use them.

Educators have the right and obligation to become critical evaluators of the educational software being produced and distributed. The guidelines presented here will help you begin this evaluation process.

They are in no sense complete, nor are they meant to be. All individuals will develop their own criteria, weighing items differently, depending on the setting, the audience, and the educational goals to be met. In all cases, the concepts must be presented in a way that make them accessible to the audience for whom they are intended.

Joyce Hakansson, Director of Computer Development at Children's Television Workshop (CTW), New York, was responsible for the design, courseware development, and installation of the Computer Gallery in CTW's Sesame Place, a prototype family educational and recreation center recently opened in Longhorn, Pennsylvania. Formerly coordinator of computer education at Lawrence Hall of Science, Berkeley, California, Hakansson was involved in the development, implementation, and introduction of the Apple Van, a mobile science shuttle that transports microcomputer-literacy demonstrations and model-classroom applications to San Francisco's Bay Area schools.

IDENTIFYING GOOD COMPUTER COURSEWARE

Mary L. Crowley
Department of Education
Dalhousie University

Rapid advances in technology coupled with declining production costs have resulted in the entrance of the computer into the classroom. Whether this is seen as friend or foe, fixture or fad, depends to a large extent on the quality of the resultant education. It is not surprising, therefore, that the problem of identifying good courseware is of major concern to teachers.

Some of you will be gifted programmers (as will be some of your students) and will develop programs to meet your personal teaching objectives. Most of us, however, will have to rely on courseware prepared by others -- both commercially and those our colleagues will write. This can be frustrating and expensive if the materials do not meet our expectations. Given that much of the courseware used in our schools will be written by someone else, there are three major concerns surrounding its selection. How does one get courseware for review? How does one evaluate courseware once it is obtained? How does one get good information about courseware when factors such as time and money rule out personal evaluation? None of these questions is easily answered.

In discussing the three questions raised above it is essential that terminology be clearly understood. The term "package" is used in NOVA MATH to mean a program or collection of programs. Many programs have accompanying literature such as a sample, if not complete, listing of the program and, with educational packages, a teacher's guide and/or student workbooks. It is not unusual for these printed materials to be called "documentation ". That term, however, is also used to refer to notes within a program. To avoid confusion, this journal will use the term "accompanying literature" to mean the written information provided as supplementary to a package. Collectively, a package and its accompanying literature will be refered to as "courseware".

Obviously, courseware may be obtained directly from a publishing company or through a local distributor or computer representative. If you know you are interested in a particular package, ask the publisher for a preview copy. Don't be surprised, however, if they do not allow review copies to be distributed. Too many people illegally copy a package on loan, then return the original without purchasing it. Because of this, many courseware distributors have been forced into requiring purchase without preview in order to make a profit. Nonetheless, ASK! You may be pleasantly surprised. Alternatively some companies, especially for a set of programs, will distribute a demonstration disk free or for a small fee. You can then base your decision to buy on your evaluation of that sample without having to purchase the entire set blind. Another way to preview courseware before purchase is to ask your local representative to schedule a demonstration session. He may be particularly responsive if he knows you have invited several other prospective buyers to the viewing.

With the increasing educational use of computers, many of your teaching colleagues will be good sources of courseware information. Call other schools in your area to see if they have courseware you are interested in. If they do , you will be able to learn about their classroom experiences as well as preview the material. If they don't have it, perhaps they have something as good (or better!) which they would share with you. At the very least, you may have found another source of information about the use of computers in the school.

Many professional organizations are also concerned with the impact and uses of computers in education. Often information about courseware, if not the courseware itself, is shared at the conferences sponsored by these groups. In mathematics, the National Council of Teachers of Mathematics and the Nova Scotia Mathematics Teacher's Association have both recently expanded their conference offerings to include computer related topics. Sessions have ranged from the history of computers to how to use computers for instruction, research and information management.

Once you have acquired a package, you need to determine its suitability for your teaching purposes. It is important to realize that you do not have to be a computer expert to identify educationally sound courseware. The criteria we currently use for selecting textbooks, workbooks, audiovisual aids, etc. can be applied towards evaluating courseware. It is still important to ask if the activity is appropriate for the academic abilities of the student user, if the courseware enhances the student's understanding of the concept being developed, if the lesson can be better taught using another medium, and if the courseware is interesting, etc.

The form in the middle of this journal is a suggested guideline for evaluating computer courseware. The first section deals with general information--package name, purchase details, machine requirements (remember a program written for a PET will not run directly on an APPLE and vice versa as there are different versions of BASIC used), intended audience, and type of instruction. Next, space for a short descriptive statement about how you use the courseware is provided. The third section asks for a description of the interaction possible between the user and the program. While it might be of interest to some readers to discuss the internal structure and programming steps with a program, we have adopted a black box approach (i.e. we are considering only what is input and what is output as opposed to the internal mechanics of the running of the program). Section four is concerned with the nature and quality of the accompanying literature and the last section provides an opportunity for an open-ended discussion of the courseware.

These guidelines should be useful both to those reviewing courseware and to those who intend to program on their own. The editors of NOVA MATH would appreciate knowing from those of you who use this form, as well as those of you who have had other reviewing experience, how this list might be strengthened. If there are important omissions or if there are entries which are of little help, please tell us. We are striving to develop a form which summarizes courseware accurately, clearly and concisely. While we are aware that many other guidelines are appearing, most recently one from NCTM, we feel the strength of this form will be that it is designed by a local audience to meet local expectations.

The third question raised at the beginning of this article dealt with obtaining good courseware descriptions when personal previewing is impossible. As we have seen, obtaining courseware is not always easy or feasible. Thus, we will have to rely on others for our information. Often, however, when you do find a review of a particular package, the meanings of the terms are unclear, it does not describe the characteristics which are of interest to you and/or you do not know how reliable the reviewer is. NOVA MATH hopes to avoid the first two problems in that it can serve as a dependable and useful source of courseware information. In addition to presenting articles of general interest to computer users, we intend to devote the middle section of each issue to courseware review. To do this effectively, we need your cooperation and contributions. If you do like a package or if you do not like a package, fill out the evaluation form on the centre pages and send it to Glane Gorveatt, Computer Editor, NOVA MATH, Department of Mathematics, Statistics and Computing Science, Dalhousie University, Halifax, Nova Scotia, B3H 4H8.

The introduction of the microcomputer into the classroom has put many teachers in the position of having to make decisions about their use without much training or support. Educators with small budgets and minimal computer experience are finding it their responsibility to acquire and evaluate courseware for student use. However, teachers do have the skill and expertise to make informed decisions, provided they have useful evaluation criteria and a dependable information network. With your support, NOVA MATH will help in meeting these goals.

SOFTSWAP: THE EVALUATION AND DISSEMINATION OF NON-COMMERCIAL TEACHER CREATED SOFTWARE

Ann Lathrop
Library Coordinator
San Mateo County Office of Education

An educational software library for microcomputers has been established in the Microcomputer Center of the San Mateo County Office of Education in Redwood City, California. It is a joint project of the County Office and Computer-Using Educators (C.U.E.). The non-commercial public domain programs contributed to the Center by teachers and other educators have been evaluated, edited and organized into the SOFTSWAP, a free exchange of instructional software for classroom use. Approximately 200 programs are currently available in the SOFTSWAP for use with the five microcomputers in the Center: TRS-80, PET, Atari, Apple & Compucolor. Visitors to the Center may copy programs without charge and disks of programs are also available for mail-order sales.

The Microcomputer Center and SOFTSWAP in the San Mateo County Office of Education have grown from a dream into a reality in just over a year. The moving force behind the Center is a California based group of teachers and administrators, Computer-Using Educators (C.U.E.), who are dedicated to expanding the educational uses of microcomputers in schools. Administrators within the San Mateo County Office of Education, under the leadership of Superintendent William K. Jennings, worked cooperatively with members of C.U.E. to establish this resource center where educators can experiment with five different microcomputer systems, preview a wide variety of commercial software for use on these microcomputers and copy any of the approximately 200 public domain instructional programs that make up the SOFTSWAP.

HISTORY

We receive many inquiries from educators in other areas who would like to replicate the Center that we have established. In our reply we stress the fact that none of the activities sponsored by the Microcomputer Center would be possible without the strong support of C.U.E. members. Computer-Using Educators was founded in 1978 by Dr. William (Sandy) Wagner, currently the Microcomputer Consultant for the Santa Clara County Office of Education in San Jose, CA. In less than three years the group has expanded from the small group of founders to a present membership of over 800, with members in 28 states and 8 foreign countries. Under the current president, Mrs. Bobby Goodson, C.U.E. is continuing to support a strong program of workshops, conferences and other meetings designed to expand the use of computer technology in education.

The SOFTSWAP originated as an exchange of educational software at the 1979 Annual Conference of the California Mathematics Council (Northern Section). This first venture was organized by Vince Contreras from San Jose State University. The programs contributed by participating teachers were deposited in the newly established Microcomputer Center in the spring of 1980. Teachers, administrators, students and other interested volunteers worked through the summer to evaluate, edit and revise these original programs. As new programs continue to flow into the Center they are routed to C.U.E. volunteers for evaluation and processing. Finished programs are placed onto SOFTSWAP Dissemination Disks which can be copied by anyone coming into the Center.

An increasing number of requests from outside the San Francisco Bay area encouraged us to begin a mail-order distribution service this spring. Our first catalog, which was published in the CUE NEWSLETTER, listed approximately 200 programs. We expect to receive more programs as word of the SOFTSWAP project spreads. These also will be evaluated and processed for dissemination.

SOFTSWAP PROCEDURES

What makes the SOFTSWAP unique among the many users' group libraries available across the United States? The primary distinction is one of focus--

SOFTWARE REVIEW

by Karen Jostad

Title of Product:	Mathware: Basic Math
Produced by:	Math City 4040 Palos Verdes Dr. N. Rolling Hills Estates, CA 90274 (213) 541-3377
Support Materials:	Teacher manual
Cost:	$59.00 each diskette (5 in all)
Equipment:	Apple II Plus—48K with single disk drive Applesoft BASIC & DOS 3.2

Product Description by Math City

"You have not bought a simple drill program. You have purchased a powerful teaching system that is very simple to use and yet extremely sophisticated in operation. Although invisible to the user every question asked carries with it a "tree" - - which branch of the "tree" the computer selects is determined by the student's responses. Every branch, question, lecture, explanation, and comment has been given meticulous thought and extensive testing. We at Math City hope our mathware helps to develop a greater understanding and appreciation of the beauty of mathematics."

Diskettes available in the Basic Math series are as follows:

- Addition and Subtraction
- Multiplication and Division
- Fraction Concepts and Operations
- Decimal Concepts and Operations
- Ratios and Percents

MECC Classroom Review Situation

June Hendrickson of Washington Elementary School in Hibbing, Minnesota used two diskettes from the Basic Math series: "Decimal Operations and Concepts" and "Multiplication and Division". Students of all ability levels in her sixth grade class worked on the programs individually. Twenty-four students used the Decimal diskette, and twelve used the Multiplication/Division diskette. Students used the materials an average of thirty minutes each. The materials were also reviewed by Lois Edwards, a mathematics educator on the MECC Development staff.

MECC Evaluator's Critique

1. Educational Content or Value

June Hendrickson comments that the series "treats learning of math concepts as serious business, not just fun." The content of the drills is accurate. The amount of material covered in any one diskette is exhaustive. The designers of these materials took the usual drill and practice type program a step further and developed what might be termed "guided drill". The student receives help either as the result of answering incorrectly or by requesting the help. The student is never actually taught an operation in the sense of a tutorial in which the student learns "why" things are done in certain ways. Rather assistance is provided by showing the student the procedure to follow in a particular operation. By doing the problems the students are developing an intuitive understanding of the rule for the operation. Integrating the material into a classroom requires preparation time. The teacher must become familiar with the instructional material keyed to each concept area and with the way a change in difficulty level alters the problems presented in the drill. Neither the documentation or program tells how the problems in each drill vary in difficulty level or number of problems presented.

2. Ease of Use

No problems in using the programs were revealed during classroom review.

3. Level of Student Interest

The majority of students who used the diskettes stated that they would like to do more lessons. In response to the question of whether the lesson was fun, OK, or not fun at all, the majority responded "OK" or "fun", with very few responding "not fun at all". The teacher reported that the amount of time students spent on each lesson and their desire to do more lessons varied greatly with the types of problems they were doing. The extremely repetitive drills were not popular, while the drills with more novel presentation and more varied problems were successful in holding student interest.

4. Use of Computer Capabilities

A student noted on her evaluation form, "I like the program on volume because it had pictures instead of having just numbers." Volume is one of the few topics with which the designers used graphics.

The problems in the drills cannot be worked on the computer. They must be done in the mind or on paper. Only the answer is entered in the computer. Record keeping allows for retention of information on only one student at a time. Feedback to the student sometimes contains slang or discouraging comments such as "nothing of the kind!", "now you're cooking!", "my transistors tell me . . .". There are instances of poor screen formatting, such as multiple flashing cursors, erasure of parts of the screen needed for reference by the student, and scrolling. On the positive side, many math operations are covered per diskette, and a choice of five difficulty levels is provided.

5. Support Materials

The support booklet is brief but necessary. It describes the use of each option in the program and lists the concepts covered in each of the five diskettes.

Evaluation Summary

The most positive aspect of these materials is their comprehensiveness. They thoroughly cover and provide drills for a great number of basic math operations. In addition, they are technically sound.

The record-keeping restriction of only one student is difficult to work with in a classroom. This seems to limit the use of these materials to remedial work for specific students. They also have use for home-bound or home learning situations, the environment for which these materials were actually designed.

Although the cost of these materials is not prohibitive, other drills are available commercially at a similar price in which students work problems on the computer rather than on paper.

8) Do you provide hints and/or eventually give the user the correct answer? We usually allow only 3 or 4 incorrect responses before providing either a hint or the correct response, often with some instruction or explanation. Exceptions are programs which are tests or timed drills for accuracy.

Two other factors are considered when evaluating programs for the SOFTSWAP. We try to be sure that the program submitted is truly an original creation of the author. If it is an adaptation from another program or from a book or journal we want to be aware of that fact. We will then request the author's permission to include the program in our collection. If we discover that a SOFTSWAP program is actually an infringement on someone else's copyright we remove it from the dissemination disk.

Finally, the most exciting programs which we receive are the creative ones that do more than just put workbook pages and drill problems onto the computer screen. Software is improving as educators become more sophisticated programmers. Newer programs are often more challenging to the student user and make far better use of the unique capabilities of the computer. We are especially pleased when we receive donations of this type of program and take special pride in being able to make them available to other teachers through the SOFTSWAP.

PREVIEW OF COMMERCIAL SOFTWARE

The third function of the Microcomputer Center is to serve as a display area for copyrighted commercial educational programs. Many software firms have provided sample copies of their instructional materials for preview by visitors to the Center. We have also been able to purchase some exemplary programs with funds from the San Mateo County Office of Education. Our goal is to make available selected software for each of the five microcomputer systems in the Center in order to demonstrate the special features of the system. We also want to give the potential user some idea of the range and quality of materials available in various subject areas at both the elementary and secondary levels.

THE MICROCOMPUTER CENTER

A unique feature of the Center's development has been the close and continuing cooperation between Computer-Using Educators and the San Mateo County Office of Education. Visitors to the Center frequently ask about our funding. To date we have not received any outside grants or other financial aid. The Center is supported in part by the County Office as a service to the educators in our county and throughout the San Francisco Bay area. Hundreds of hours of volunteer time are donated by C.U.E. members as they participate in the educational activities and demonstrations scheduled at the Center. C.U.E. members also contribute the expertise needed to evaluate and edit the instructional programs in the SOFTSWAP. County Office staff, including the author, provide the organization necessary to maintain the SOFTSWAP and other projects.

Manufacturers of microcomputer hardware have also been generous in their support of the Center. Tandy Radio Shack and Commodore PET provided the first microcomputer systems and thus initiated the support that has made possible all subsequent development. Each firm set up a complete system with microcomputer, dual-disk drives, printer and cassette-recorder--all on long-term loan to the Microcomputer Center. A library of commercial programs loaned to the Center by each firm includes educational software and word processing systems.

Other firms providing equipment for the Center include Atari, Apple and Compucolor. All of the systems are on long-term loan; the Center has not purchased any hardware. C.U.E. members were of great assistance in contacting the various firms and securing their support and cooperation.

All of the manufacturers have been helpful in maintaining the equipment in good condition, despite the heavy use in the Center. They also provide new models as they are developed. This strong commitment on the part of the manufacturers has been a crucial factor in our success.

STEERING COMMITTEES

The development of the Microcomputer Center has been characterized by cooperative interaction of County Office staff from several divisions within the office. The Microcomputer Center is located in the Educational Resources Center Library, under the direction of Dr. Curtis May. The SOFTSWAP is coordinated by Ann Lathrop, author of this paper. Dr. James Fee, Director of Media Services, offers assistance with hardware applications and demonstrations. Curriculum development programs and in-service training are the responsibility of LeRoy Finkel, computer consultant, and Walter Smithey, math-science consultant, working under the direction of Tom Quinn. Dr. Al Grossman, Administrator of the Office of Information Services, has developed an extensive program that will interface computers in the County Office to the microcomputers in the Center and in schools throughout the County.

Utilization of this team approach assured a broad base of support and has made the Center responsive to the needs of many different groups within San Mateo County. The entire project is under the administration of Dr. Don Halverson, Assistant Superintendent for Educational Support and Planning.

Four members of Computer-Using Educators served on the Steering Committee for the Center and for the SOFTSWAP. Jim Love (PET), Brian Sakai (TRS-80), Dave Stone and Bob Enenstein (Apple) contributed the time and effort necessary to guide the Center through its first year and to create the SOFTSWAP.

SUMMARY

We have achieved our goals of providing equipment for demonstration, commercial software for evaluation and public domain programs which can be copied by teachers for classroom use. The working partnership between C.U.E. and the San Mateo County Office of Education has created a Center which we feel has a significant role in the developing uses of microcomputers in education.

SOFTSWAP concentrates on the development of educational software. Most of the programs are short, stand-alone instructional units. Many are drill and practice exercises written for the elementary school or for remedial work at the secondary level. About one-third of the programs are math oriented. Most games have been excluded since these are generally available from many other sources. Only a few utilities, those of special interest to teachers, were on the first series of SOFTSWAP disks; these also are readily available from many user groups.

A second feature of the SOFTSWAP is the fact that every program is evaluated by at least two educators before it is added to a Dissemination Disk and made available for copying. Programs are edited for spelling errors, inaccurate or incomplete instructions, errors in factual content, programming errors and other problems. Our goal is to distribute only those programs which have some educational value and which are as free of errors as possible in both content and programming.

We have developed a very workable system for processing new educational programs donated to the SOFTSWAP. The entire procedure operates with part-time clerical staff, paid student assistants and volunteers from C.U.E.

Each donor is asked to complete a PRELIMINARY INVENTORY FORM (blue) that identifies and describes the program and a RELEASE FORM (green) that gives C.U.E. permission to distribute the program. The donor's form also asks whether the program is original, a modification of another program, or an adaptation from a magazine or book listing.*

Each donated program is first loaded onto a "Receiving Disk" where it will remain in its original contributed form as a permanent record. Filled"Receiving Disks"are placed into our permanent archives after all of the programs on that disk have been processed. One donated program at a time is loaded from the "Receiving Disk" onto a "Working Disk" and all subsequent versions of that program will be stored on the same disk until the program is finished and ready to be transferred onto the "Dissemination Disk." We have approximately 40 working disks, each with only one program, being evaluated at any given time. At least two educators will review the program on the "Working Disk" and make needed revisions. When they agree that it is finished the program will be removed from the "Working Disk" and added to the current "Dissemination Disk" in the SOFTSWAP. Another program from the "Receiving Disk" can then be loaded onto that "Working Disk" and the evaluation process will be repeated. All finished programs on the "Dissemination Disks" are available for copying by visitors to the Center.

We have two forms to aid in the evaluation of programs: CHECKLIST FOR MICROCOMPUTER PROGRAM REVISION (salmon) and PROGRAMMER REVISION SHEET (Yellow).* These forms list common errors and problem areas which the evaluators are to check. Detailed notes about needed revisions are made on the yellow form and the final reviewer checks to see that all requested corrections have been made. The finished program is described on a final INVENTORY FORM - SOFTSWAP (white) and then added to the SOFTSWAP catalog. Newly developed programs are also listed periodically in the CUE NEWSLETTER.

EVALUATION OF SOFTWARE

The evaluation forms developed for use in the Microcomputer Center are not designed to produce critical reviews for publication. Our primary interest is in cleaning up a program, being sure that it runs well, eliminating spelling errors, factual errors, etc. The actual quality of the programs in the collection varies greatly, as does program length. Each disk contains from 12 to 30 programs, all for one system, but for various subjects and grade levels.

Each program is checked for accuracy of content, clear instructions, trapping of input errors, etc. Certain problems which frequently appear in contributed software could be reduced or eliminated if donors would ask themselves the following questions:

1) Does the program run with relatively few problems? (Unfortunately, we receive many programs which do not load/run at all.)
2) Does the program trap input errors? Does it crash if the user inputs numeric response when the computer is expecting alpha, or vice versa? What happens if the user hits an unwanted ENTER/RETURN? When there is an input error, is the computer response clear and simple? "Input error, redo from start" is not helpful to the novice.
3) Are all words spelled correctly?
4) Are the instructions and other information easy to read on the screen? It is best to avoid crowding and to clear the screen at appropriate intervals. Instructions should be written at a reading level appropriate for the intended user.
5) Is the POSITIVE reinforcement for correct responses more interesting than the negative reinforcement for errors? Graphics in most HANGMAN games, for example, are usually much more exciting when the user loses and is hanged. Students will often deliberately miss a problem or word in order to see a rocket explode, a boat sink, etc. Try to provide strong encouragement for doing the task correctly and yet avoid over-praising.
6) Have you included REM statements as needed? They make it easier to use a program effectively. It is especially helpful to include statements telling the teacher how to modify word lists, problems or other entries.
7) Do you make negative remarks to or about the student? Sarcastic statements can be discouraging. We remove words like "Boy was that dumb," "Stupid," "Dummy," etc.

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*forms available from the author at the San Mateo County Office of Education, 333 Main St., Redwood City, California 94063

APPENDIX IX

PRECIS

This appendix contains information about four organizations currently using PRECIS indexing method:

1. ONTERIS
2. YORK COUNTY BOARD OF EDUCATION
3. FORMAT
4. CONTROL DATA CORPORATION (producers of PLATO Systems.

USER: ONTERIS (Ontario Educational Resources Information Service)

USE: Indexing of educational support documents including curriculum guidelines, research documents, and documents relating to commissions, reviews and special projects. Products include microfiche, a printed catalogue and an on-line database.

CONTACT: Majorie Mercer
Coordinator
Information Centre
Research Branch
Ministries of Education, Colleges, and Universities
Queen's Park
Toronto, Ontario
M7A 1L2

(416) 965-4110

ONTERIS uses the PRECIS subject index in the production of its printed index to educational support documents. However, it should be noted that two types of subject analysis are performed on each document: a PRECIS subject analysis and an ISIS (Integrated Set of Information Systems) slashing of keywords. Whereas the former is used in the production of the print index, the latter is responsible for the accommodation of on-line retrieval techniques. ONTERIS has much to contribute in terms of database management experience and its rationale in this regard merits close consideration and further study.

In addition, ONTERIS represents a prominent Canadian example of on organization which has had to catalogue a large body of previously untreated, uncatalogued material. The following information outlines ONTERIS procedures for processing documents and gives some examples of various records.

What is ONTERIS?

- a computerized online storage and retrieval system
- an answer to the need for efficient sharing of information in the field of education
- a potential repository for all types of educational material
- an umbrella for 3 bibliographic databases

CURRICULUM GUIDELINES AND SUPPORT DOCUMENTS

A database of over 3200 records of Ministry of Education guidelines and support documents, and material from the school boards throughout the Province.

EDUCATION RESEARCH

A database of over 1900 records of research documents from school boards, the Ministry of Education, the Ministry of Colleges and Universities, the Ontario Institute for Studies in Education, the Ontario Educational Communications Authority, and the Ontario Educational Research Council.

COMMISSIONS AND PROJECTS

A database containing records of material related to commissions, reviews, and special projects funded by the Ministries of Education and Colleges and Universities, such as the Commission on Declining School Enrolments (CODE), with 366 briefs and working papers, the Secondary Education Review Project (SERP), with over 2700 records, and the Commission to Review the Collective Negotiation Process between Teachers and School Boards (the Matthews Commission), with 135 records.

For further information on ONTERIS:

Marjorie Mercer - Co-ordinator	965 4110

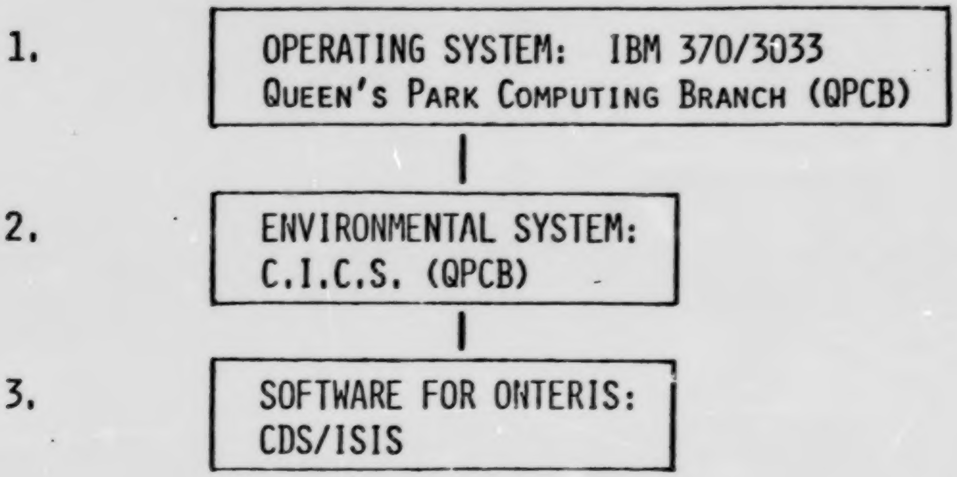
For further information on the Information Centre:

Carol Fordyce - Manager	965 4581

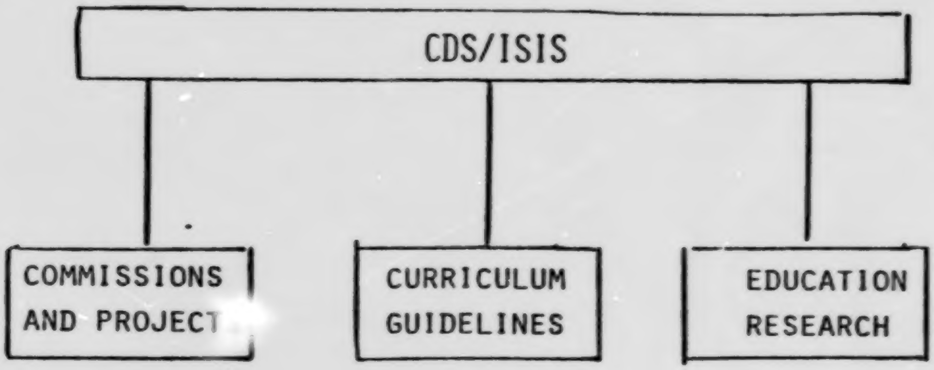
TO REQUEST A SEARCH:

Ilze Cockburn - Subject Analyst	965 4110

COMPUTER ENVIRONMENT


1.
OPERATING SYSTEM: IBM 370/3033
Queen's Park Computing Branch (QPCB)
2.
ENVIRONMENTAL SYSTEM:
C.I.C.S. (QPCB)
3.
SOFTWARE FOR ONTERIS:
CDS/ISIS

ONTERIS DATABASES

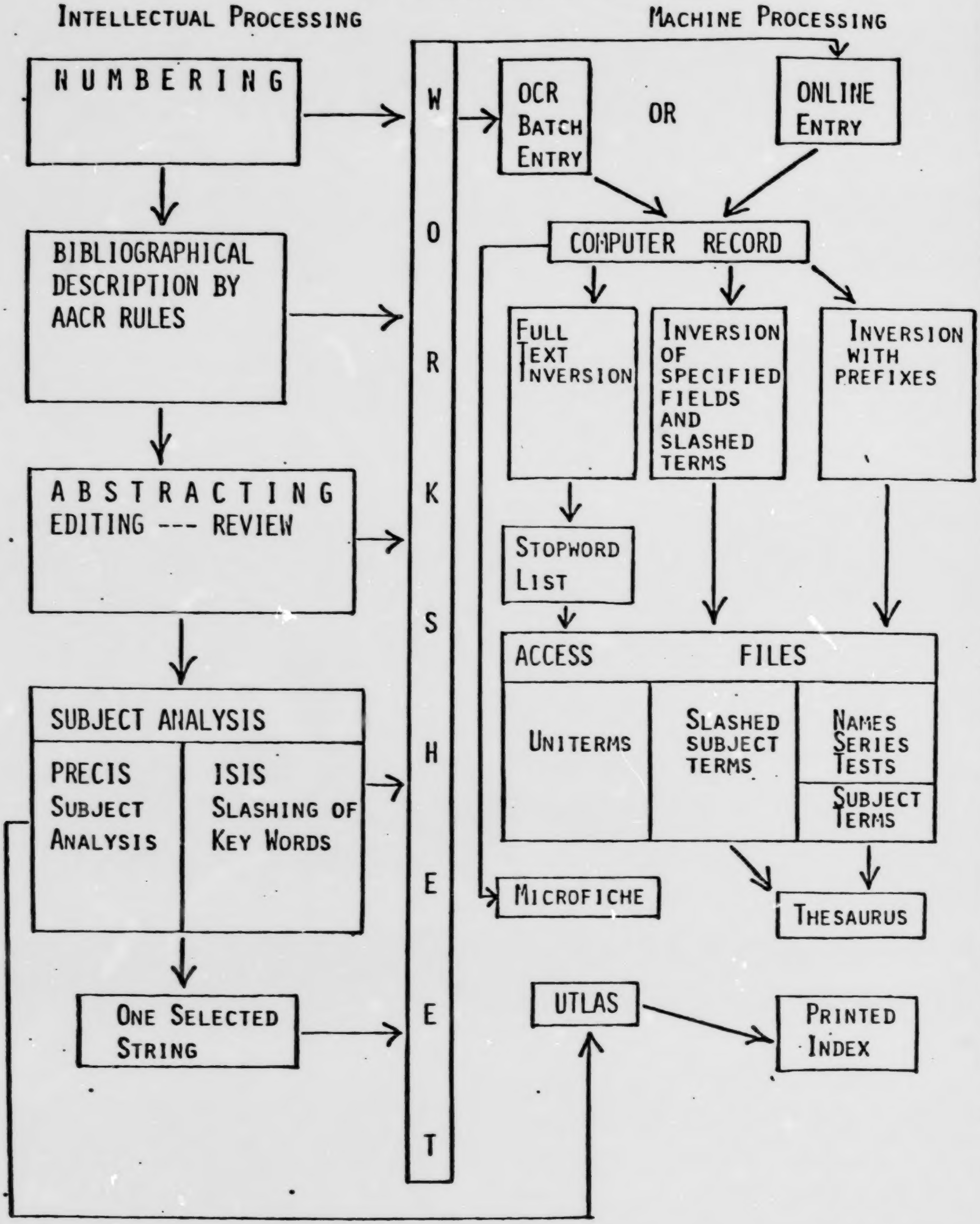

CDS/ISIS
COMMISSIONS AND PROJECT
CURRICULUM GUIDELINES
EDUCATION RESEARCH

CICS - Customer Information Computer Services

CDS - Computerized Documentation System

ISIS - Integrated Set of Information Systems

PROCESSING FOR BIBLIOGRAPHICAL RECORDS


INTELLECTUAL PROCESSING
MACHINE PROCESSING
NUMBERING
BIBLIOGRAPHICAL DESCRIPTION BY AACR RULES
ABSTRACTING EDITING --- REVIEW
SUBJECT ANALYSIS
PRECIS SUBJECT ANALYSIS
ISIS SLASHING OF KEY WORDS
ONE SELECTED STRING
WORKSHEET
OCR BATCH ENTRY
OR
ONLINE ENTRY
COMPUTER RECORD
FULL TEXT INVERSION
INVERSION OF SPECIFIED FIELDS AND SLASHED TERMS
INVERSION WITH PREFIXES
STOPWORD LIST
ACCESS FILES
UNITERMS
SLASHED SUBJECT TERMS
NAMES SERIES TESTS
SUBJECT TERMS
MICROFICHE
THESAURUS
UTLAS
PRINTED INDEX

ONTERIS COLLECTION

EDUCATION RESEARCH

In Progress Records	19
New Records	137
Full Records (Ministry of Education, Ministry of Colleges and Universities, school boards, Ontario Educational Communications Authority, Ontario Educational Research Council, and Ontario Institute for Studies in Education)	1971
TOTAL	2127

COMMISSIONS AND PROJECTS

Commission on Declining School Enrolments	366
Commission to Review the Collective Negotiation Process between Teachers and School Boards	135
Secondary Education Review Project	2821
TOTAL	3322

CURRICULUM GUIDELINES AND SUPPORT DOCUMENTS

Ministry In Progress Records	102
New Records (Ministry & school boards)	852
Full Records (Ministry & school boards)	2365
TOTAL	3319

A CURRICULUM DATABASE RECORD

CD02679 —— ①

② —— MATERIAL TYPE: Guideline
③ —— MATERIAL STATUS: Current
④ —— LANGUAGE OF DOCUMENT: English
⑤ —— CORPORATE AUTHOR: Ontario Ministry of Education
⑥ —— BRANCH RESPONSIBLE: Special Education Branch
⑦ —— TITLE: Education for Students Who are Homebound, Hospitalized, or in a Residential Treatment Centre.
⑧ —— PLACE: Toronto
⑨ —— PUBLISHED: 1980
⑩ —— PAGINATION: 19 p.
⑪ —— CURRICULUM SUBJECT: Special Education
⑫ —— DIVISION: Primary Division; Junior Division; Intermediate Division; Senior Division
⑬ —— TARGET POPULATION: Handicapped students; Homebound students

⑭ —— CONTENT

Guidelines for and current trends in the provision of programs and services for students who are homebound, hospitalized, or in residential treatment centres, are presented in 3 sections. In the section on administration, topics treated are: objectives of programs, advantages and disadvantages of programs, responsibilities of a senior official, the supervisor, eligibility of students, referrals for educational programs, termination of instruction, the selection of teachers, the responsibilities of parents involved in home instruction programs, and programs for students with behavioural exceptionalities, severe mental handicaps, or communication exceptionalities. A sample daily program is given.

In a section on the teacher, topics are: teaching in home, hospital or treatment centre programs; do's for teachers; teacher's procedure subsequent to receipt of a referral for home or hospital instruction; the initial home visit prior to instruction; the initial lesson; the hospital or treatment centre setting; participation in multidisciplinary team conferences; time for instruction; and teachers' records. Differences between the classroom and home visiting teachers are charted.

b2 In a section on programming, topics are: types of programs (short-term, long-term, programs for students with a terminal illness), with objectives, procedures, and some curriculum and teaching suggestions; instructional aids; and the student.

⑮ —— NOTES: 1. CD02680: French version, Programmes d'enseignment pour les élèves retenus a la maison, a l'hôpital, ou en institution
2. Revision in progress: CD03116

EXPLANATION OF A CURRICULUM DATABASE RECORD

1. CURRICULUM DOCUMENT OR CD NUMBER: A unique identifying number is given to each document.
2. MATERIAL TYPE: A description of the type of document is given by using the appropriate term from: guideline, handbook; bibliography; resource document.
3. MATERIAL STATUS: This is included as a means of differentiating between material currently in force and that which has been superseded. When the document is superseded, the CD number of the current edition is given in the Notes section.
4. LANGUAGE OF DOCUMENT
5. PERSONAL OR CORPORATE AUTHOR: For machine searching purposes, one version of the name is used consistently. If there are both a personal and a corporate author, the personal author precedes the corporate author.
6. BRANCH RESPONSIBLE: For ministry curriculum documents, the issuing branch is identified, as are, if included in the document, the name(s) of the compiler(s).
7. TITLE: This is given as it appears on the title page or, in the absence of a title page, the cover.
8. PLACE OF PUBLICATION
9. DATE OF PUBLICATION: If no date is available, the date of the receipt of the document at ONTERIS is given.
10. PAGINATION
11. CURRICULUM SUBJECT: A standardized list of curriculum subjects based on Ministry of Education subject areas is used.
12. DIVISION: The grade and division is entered as indicated on the document, e.g., Intermediate Division or Grade 3 or Year One. In order to provide access to all divisions covered by a document, a wide grade range such as kindergarten - grade 13 would be entered as follows: Primary Division; Junior Division; Intermediate Division; Senior Division. Levels of instruction, such as modified, basic, general, and advanced in grades 9-13, are indicated if they are specified in the document.
13. TARGET POPULATION: When a document has been prepared for use with or by a special group (e.g., exceptional students, adults, etc.) that group is indicated.
14. CONTENT: More detailed and flexible than an indicative abstract, this field provides a description of the contents of a document, reflecting its specificity.
15. NOTES: Related records, French versions, and other bibliographic notes are given to link documents.

RESULTS OF SEARCHES ON THE RESEARCH AND CURRICULUM DATABASES

Request: Material dealing with human relations and sex education in elementary education

SEARCH RESULTS

Research Documents Retrieved - 1

PROCESSED REPORT ON01461
Pond-Brevik, Margaret.
-- Family Life-Sex Education Programming : A Study of Students' Needs.
-- Aurora, Ont. : /York County Board/ of Education, Division of Planning and Development, Research Office, 1978. -- ix, 105 p.

SUBJECT

/STUDENTS/. /Elementary schools/ and /secondary schools/
  /Attitudes/ to /family life education/ and /sex education/ /programs/
  /Educational needs/ in family life and sex education -- Study regions: /York County/

Curriculum Documents Retrieved - 40

Sample records

CD01843

MATERIAL TYPE: Bibliography; Resource Document
LANGUAGE OF DOCUMENT: English
CORPORATE AUTHOR: Toronto Board of Education
TITLE: Resources Related to Personal and Social Aspects of Guidance Programs
PLACE: Toronto
PUBLISHER: Toronto Board of Education, Guidance and Counselling Services
PUBLISHED: 1970
PAGINATION: 17 p.
CURRICULUM SUBJECT: Guidance
DIVISION: Primary Division; Junior Division; Intermediate Division; Senior Division - K-Grade 13

CD01150

MATERIAL TYPE: Guideline
MATERIAL STATUS: Current
LANGUAGE OF DOCUMENT: English
CORPORATE AUTHOR: Ontario Ministry of Education
TITLE: Guidance : Curriculum Guideline for the Intermediate Division.
PLACE: Toronto
PUBLISHED: 1978
PAGINATION: 46 p.
CURRICULUM SUBJECT: Guidance
DIVISION: Intermediate Division

USER: York County Board of Education

USE: Indexing of print and non-print materials for Aurora High School and four elementary schools in the production of COM

CONTACT: Brian Burnham
Chief Research Officer
York County Board of Education
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Aurora, Ontario

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OR

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The application of PRECIS in York County represents an example of PRECIS appropriateness to off-line or print catalogues. The following information provides an excellent summary of problems relating to design and production of school libarary catalogues, as well as a discussion of the implications of MARC (machine-readable cataloguing), COM (Computer Output Microform), and PRECIS in the search for a solution to these problems.

A COMPUTERIZED LEARNING SUPPORT SYSTEM FOR ONTARIO

Simultext of an audiovisual presentation by
Audrey Taylor, Librarian, Aurora High School
Brian Burnham, Chief Research Officer
The York County Board of Education

to The 23rd Annual Conference of the
ONTARIO EDUCATIONAL RESEARCH COUNCIL

Toronto, Canada, December 4, 1981

1.0 Introduction

This is a report of a developmental research project to investigate means of improving the quality of service in Ontario school resource centres. Users of these centres and other educational libraries need better tools for accessing information. Problems relating to the design of library catalogues and their effectiveness as curriculum support tools have been the main if not sole concern of the project.

1.1 The first part of this morning's presentation is a summary of these problems followed by a summary of what has been accomplished toward solving these problems by means of a working model of a school library cataloguing network. The network has three salient features: (1) use of a national computerized cataloguing network; (2) computer-produced microfiche library catalogues and other products; (3) use of PRECIS, a new computer-assisted indexing system to produce the subject section of the library catalogue. The final part of this section points out what else must be done before the prototype network now operating in York County Board schools can be applied provincially in a cost-effective manner.

2.0 Problems facing school library staff and users

Once established, stocked and staffed, school resource centres provide materials for curriculum support and also for the personal growth of students and professional development of staff. However, many librarians and other educators believe that school library resources are seriously underused. Observational studies give credence to this belief. Some underuse appears to be due to various inadequacies in the library catalogue, which should help those seeking materials, but more commonly frustrates them.

Problems inherent in a school library catalogue relate to how it is produced, its physical format (almost invariably a card catalogue), and the traditional subject indexing systems.

2.1 Production problems

Normally, the resource centre catalogue is either produced by the school librarian or purchased from commercial sources or a mix of both.

In the first mode, the teacher-librarian performs the necessary intellectual tasks -- examining each acquisition, consulting the cataloguing reference tools, and drafting the cards. This is followed by labor - intensive clerical tasks, such as the typing and filing of the cards by the librarian or assistant (if one is employed) or often by a student or parent volunteer. Similarly, time and energy are consumed to generate labels for book spines, circulation cards, etc.

Catalogue card sets are also available from commercial vendors. Providing that funds are available, the librarian can purchase most of the cards, correct or add supplementary data, and then direct the filing of the cards and so on. The subject index cards so supplied present problems since they use standard subject headings lists not designed with the school library user in mind, and do not include the "See" and "See also" references. This problem will be re-examined later.

In addition to the visible costs of card sets, there are invisible cost factors associated with having the teacher-librarian perform technical and clerical tasks. Such tasks take time away from professional work with students and staff.

In some instances, a librarian is appointed well in advance of the opening of a new school (a year in the case of a secondary school). Much of this time is spent cataloguing; alternatively, money is spent for commercial products. Even then an adequate catalogue may not exist when the school opens. (The authors of this report experienced an instance where a high school library was closed all the school's first year while cataloguing was being completed.) With a school librarian's salary today running up to or even beyond $35,000 a year, this is an inefficient as well as ineffective use of time and money.

Cataloguing production costs have to be incurred. But, for each item, the intellectual work of cataloguing needs be performed only once and the results stored in a computerized data base. These bibliographic records can then be shared. Also, this data base can be used to produce, by automated means, catalogues and other technical products. In spite of the availability of systems to do these tasks, efforts and costs are still being replicated in virtually every school library or central processing facility. Finally, despite the labor and money expended on technical chores -- and the misuse of the professional teacher-librarian at a technical level -- the resultant card catalogue is still largely an unsatisfactory product.[1]

2.2 Physical format problems

School libraries almost invariably use card catalogues. The physical format of the card, housed as it is in catalogue drawers, leads to a number of unsatisfactory conditions both for library staff and users.

For the teacher-librarian, the sorting and filing of cards involves much time. Hence these tasks are often left to untrained volunteers who, through lack of knowledge of filing rules and human fallibility, commit errors which detract from the catalogue's usefulness. Similarly, the card catalogue is seldom up-to-date. The cards relating to lost or withdrawn materials are seldom removed from the catalogue because this requires time and effort. It is also very time-consuming and hence costly to retrieve cards and to revise them in order to update terminology. For example, when a nation takes a new name (Zimbabwe for Rhodesia), or a new term replaces an old one (Inuit for Eskimo), the terminology is seldom revised in school library card catalogues.

The student user encounters problems with the physical format of the card. Only one card can be consulted at a time. In addition, (as students say) "you need long nails" to persevere in a card catalogue search. If others are waiting for a card drawer because there is only one card catalogue, some users may terminate their search prematurely. Other users, after consulting only one or two cards, incorrectly assume that all related materials will be found at the same location on the shelves as given on the first card(s). This is not so. School libraries normally use the Dewey Decimal Classification system which, like any classification scheme, distributes related materials to different locations. Hence the user may overlook pertinent materials.

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[1] A few Canadian school boards have centralized cataloguing and technical services and are now automating. This may reduce but not eliminate some of the problems noted. The teacher-librarian is spared certain chores when they are handled centrally. However, these few systems still face the problem of "subject access" since their data base still uses the same inadequate standard list of subject headings.

As a school library user, the teacher also faces problems. First, the teacher may find it very arduous (if not impossible) to use the card catalogue to identify all that is available to support program units in any given subject area. Part of the problem is in scanning card-by-card. Part of the problem is the need to repeat the process through each subject section which might yield leads. Hence a teacher may make a cursory check of the cards or scan the shelves or merely hope for the best when suggesting that students may find needed support materials in the library. Or the teacher may ask the librarian to prepare a bibliography for teacher and student reference or "to pull all materials" on the topic and sigh with relief, now that the problem has been shunted to someone else.

There is normally only one card catalogue for each library. This may present a minor problem to users who must go to that catalogue (when the library is open) and perhaps wait. There is an even greater difficulty in knowing what materials are in other libraries, since card catalogues cannot be exchanged or union catalogues easily compiled. This inhibits the sharing of collections which is highly desirable especially when money is scarce. Building sharable, specialized collections of (for example) expensive reference books or audiovisual materials is also deterred under these circumstances.

As a physical facility, the card format and the cabinet may also be a problem for the library. As the collection grows, so does the size of the catalogue. In time, more card cabinets must be bought and these compete with materials for floor space. This could become a problem wherever there is no expansion possibility for the library.

2.3 Subject indexing problems

One problem that the teacher-as-library-user faces stems from difficulties in determining the subject content of the resource centre's holdings. In order to make a useful recommendation for additions to the library collection (to ensure that it holds materials to support the ever-changing curriculum), the teacher ought to be able to discover *quickly* and *easily* which subject areas are well covered and which areas require additional materials. But that is out of the question since the conventional subject index distributes related materials among unrelated subject-entry terms.

The teacher-librarian is also concerned with collection building and depends on several sources when deciding what to add -- users' requests, book reviews, and personal knowledge of the collection and of curriculum requirements. The librarian cannot rely on the card catalogue as a tool for spotting weaknesses in the collection, not just because of the time required or of the physical difficulty, but because the catalogue has inadequate subject information. (Librarians will understand that the same is true of their "Shelf List" cards.)

Thus, while a catalogue's subject index ought to be useful in discovering what materials are available to support any curriculum area, the subject index section is very inadequate for the needs of school library staff and users. Subject indexing traditionally uses either the printed list of Library of Congress Subject Headings (not designed for school libraries) or "Sears" (a variant of the Library of Congress system). Neither version is satisfactory for school use for the following reasons:

a) lack of current terminology and no feasible way to up-date between revisions of the lists;

b) lack of specificity and exhaustivity in the subject entries:

c) lack of suitable terminology (terms are not intentionally curriculum-related);

d) many subject headings use "inverted" word order and form divisions;

e) lack of sufficient "access" points (each subject heading provides only one point of entry into the subject catalogue: with rare exception, up to three subject headings may be assigned to one title);

f) lack of reference structure (the "See" and "See also" aids) when, for example, cards are bought from commercial suppliers or when teacher-librarians are too busy to make such structures.[2]

2.4 Summary

So unsatisfactory is the card catalogue that school library users commonly by-pass it and go directly to the teacher-librarian who is commonly expected to be a walking, talking catalogue. Alternatively, the librarian is seen as someone with the magic skill and endurance to search through the catalogue for the user. Librarians know that this is a wasteful, ineffective, and frustating use of their talents and time and inhibits the growth of students' independent learning skills.

3.0 Technology which addresses itself to these problems

For over a decade, three computerized systems have existed which can help solve the problems noted above. These systems are the three features of the model school library network mentioned in the opening paragraph of this report.

The first computer system, called MARC (Machine-readable Cataloguing), is the heart of national computerized cataloguing networks and can eliminate repetitious cataloguing. This system provides a computerized data base whereby a network of users can share a pool of cataloguing information. The intellectual work done by one is available to all. Once the cataloguing information is in the computer, catalogues and technical products (e.g., spine labels) can be produced electronically in the format appropriate to the library.

The second system, called COM (Computer Output Microform), provides an alternative to the card catalogue format. This system displays cataloguing information covering dozens of items on one easy-to-scan "page". These "pages" can be produced on microfilm or microfiche. The latter suits schools as it is easy to use and cheap. At a 42 reduction factor, each 4" x 6" microfiche (more commonly called "fiche") can hold more than 200 normal 8 1/2" x 11" pages; thus fiche catalogues consume relatively little space. The author catalogue for a collection of 8,500 titles could fit on one fiche (see the Aurora High School author catalogue, appended). Copies of fiche catalogues are inexpensive and as many can be produced as circumstances dictate.

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[2] Commercially-produced sets of reference cards are now available. Also, Library of Congress Subject Headings are being automated and include reference authorities. How adequately these solve some of the school library's problems is not yet demonstrated.

A third computerized system, called PRECIS (PREserved Context Index System), is a subject indexing method which overcomes most of the problems in locating needed information. The PRECIS method ensures that:

a) terminology is current, and previously used terms can be easily updated;

b) subject entries are specific and can be exhaustive;

c) terminology is derived from the materials not printed lists, and is therefore curriculum-related when drawn from school library materials;

d) subject entries are in "natural" word order;

e) as many "access" points as are called for by the materials and the curriculum can be generated by this indexing system (each PRECIS "string" provides a number of points of entry; multiple strings can be assigned to one title);

f) a reference structure is an integral part of the system.

These systems are, as noted, computerized, but it is not the intention to describe now how the computers and their software work.

4.0 The Aurora PRECIS Project's results

4.1 1972-75

Between 1972 and 1975, Audrey Taylor, librarian at Aurora High School, demonstrated that a PRECIS subject index (at that time prepared manually and produced in card format) significantly improved the finding of wanted materials and won the ready acceptance of users.

Funds were sought to use a computer for the PRECIS indexing, as its British designers had intended, and to utilize the MARC system to reduce other cataloguing tasks. By using both systems, catalogues could be produced in non-card formats, i.e., book or microfiche (COM). Both the PRECIS computer program and the MARC records were already resident at the University of Toronto Library

Automation Systems (UTLAS). Thus, through UTLAS, book or COM catalogues could be computer-produced. At that time, it looked as if all that was needed was professional and technical support staff and a computer terminal.

4.2 1976-78

In 1976-78, the Ministry of Education funded the first two-year stage of the project to develop, for Aurora High School, a COM microfiche catalogue, enhanced by PRECIS, using MARC records.

By 1978, it was clear that the three systems did resolve most of the traditional problems and produce a superior product capable of very much more than the card catalogue. For instance, cataloguing information was found in the computer data base at UTLAS for about 90% of books and 50% of non-print materials for Aurora High School; minor editing of some cataloguing data is required.

The easy-to-scan microfiche catalogues were readily accepted by Aurora High school students, who found that the PRECIS subject index catalogue gave them a much clearer picture of the resources available to them. Moreover, they could now see at a glance the different shelf locations of materials relevant to their search.

In addition, through using the PRECIS subject index's "See" and "See also" structures, some students began to comprehend the hierarchical structure of phenomena -- how comprehensive entities are related to their more specific parts. As well the one-to-one relationship of terms, unique to PRECIS subject indexing, facilitates effective searching because the user can readily see how to expand or narrow the scope of his search.

Some teachers began to use the catalogue in planning their course assignments. From the beginning it was expected that microfiche catalogues and readers would find their way into the school staffroom and into department offices. If good portable readers could be found, there was no reason why the fiche couldn't go home with the teacher who wanted to do program planning there. (In fact, when the fiche catalogues were first regularly used outside the Aurora High School library, it was in the school's technical wing. The automotive teacher reported that not only did his students use the catalogue, but other students also dropped by to browse.)

However, at the end of 1978, there were still technical problems and intellectual challenges: (1) the PRECIS computer program needed updating and upgrading; (2) spine labels and other technical products were still "primitive"; (3) cataloguing of complex non-print materials was time-consuming; (4) the indexing of literature, particularly novels, needed rethinking. There was also the challenge of determining whether the indexing method used for secondary school materials could be successfully applied to elementary school library collections.

To respond to these challenges, the Ministry of Education and the York County Board jointly funded work in 1979 and 1980.

4.3 1979-80

As this stage of development draws to a close, the successes and shortfalls can be reckoned and future activities specified. A mini-network including Aurora High School and six elementary schools has come into being and is generally functioning well.

4.3.1 The list of successes include:

(a) the computerized cataloguing network is providing cataloguing information for over 90% of book materials for both elementary and secondary schools; (the percentage is even higher for materials published in North America) which means that, since original cataloguing is required for only one book in ten and that since only minor editing is needed for the remainder, there is a great saving in terms of intellectual effort and time;

(b) the computerized cataloguing network is providing cataloguing information for only 50% of non-print materials for both secondary and elementary schools but, since cataloging such materials is especially difficult and time-consuming -- so much so that it often is not even done -- this represents a very substantial benefit;

(c) not only does the original cataloguing done exclusively by the Aurora PRECIS Project staff meet the needs of all five schools presently in the York County mini-network, but statistics provided by UTLAS show that other users of the national cataloguing network, with whom we have a sharing agreement, are using the MARC format records produced by the Aurora project;

(d) Aurora High School and four elementary schools have received COM catalogues, and in all instances these have been well received, being easy to scan and making it possible to "browse" the catalogue instead of the shelves; (in November 1980, all five mini-network schools had updated or initial microfiche catalogues);

(e) the microfiche catalogues have been produced in multiple copies (at per catalogue costs as low as $1.00 to $2.00 for the entire catalogue of a small collection) so that any reasonable number of students and teachers can use this searching tool simultaneously and at locations other than the library (e.g., in departmental offices, home, staff room); these easily portable fiche have also been shared among the local mini-network members to facilitate interlibrary loan and collection-building;

(f) the computer-generated catalogue has freed the librarian from sorting and filing of cards and catalogue maintenance;

(g) for the four schools which have now had updated fiche catalogues, revision of terminology and correction of errors have been easily accomplished, because of the power of the computer;

(h) in the libraries of Aurora High School and the new elementary schools there are no space-consuming card cabinets; a microfiche reader and the fiche catalogues can be easily situated wherever there is a 30" by 30" flat surface;

(i) the PRECIS subject index has made it remarkably easier for users to discover what materials are available on a topic because of the following advantages of the PRECIS system: specificity and exhaustivity of the subject entries; curriculum orientation and currency of terminology; and, because of the special one-stage format of the catalogue designed by the PRECIS Project, all materials on a given subject are pulled together for easy scanning;

(j) the PRECIS subject index method has been used with print and non-print materials representing all major curriculum areas and there are now over 18,000 titles, well over 20,000 PRECIS "strings" and about 15,000 reference terms in the PRECIS Project file in the UTLAS data base and thus available for use not only by York County schools but also by authorized network participants across the country.

4.3.2 The problems encountered and as yet unresolved lie in these areas:

(a) work flow and materials management in a centralized technical services facility;

(b) time required in the elementary schools for the physical processing of the materials (e.g., sorting computer products, putting on labels, book cards and pockets, plastic jackets, etc.);

(c) inadequacies of some computer-generated products, e.g., labels;

(d) inadequacies of the MARC format for audiovisual materials:

(e) slow acceptance of the microfiche catalogues by teaching staff;

(f) lack of a sufficiently large file of bibliographic records enhanced by PRECIS to respond to requests of existing school libraries to join the mini-network;

(g) inability of the original PRECIS software to accomodate easily new users (other school boards, etc.);

(h) cost (staff, computer time, etc.) and acceptance by other school boards of need to automate and centralize school library technical services in order to move the project from an experimental working model of a cataloguing/information retrieval network to a production mode involving many more than seven schools in one Board's jurisdiction.

5.0 The resolution of these problems lies in these directions:

(a) re-evalute work flow and materials management, including need for more staff and hardware;

(b) address the needs of the elementary school librarians by studying the effect of providing an itinerant school aide;

(c) continue assessment and recommendations for change to UTLAS for some of the technical products;

(d) make recommendation for changes and additions in the MARC format for audiovisual materials;

(e) devise a training program for teachers which will help them to recognize the strengths of the microfiche catalogues and the needs of students, particularly in basic research skills;

(f) explore means of rapidly increasing the size of the bibliographic files enhanced by PRECIS, and so expand the central file of PRECIS data available to school users;

(g) expedite the implementation of a new PRECIS/CATSS software program;

(h) encourage librarians and school administrators to understand the implications of networking and the need for automated centralized technical services for school librarians.

Work is proceeding on these matters.

6.0 CURRENT

6.1 The project has some new undertakings. These represent both additions to the network and also new dimensions to the developmental research.

6.1.1 Three network schools' libraries have learning materials acquired either before the school joined the project or inherited from now closed non-network schools. A "retrospective conversion" process began in 1980 and, at present, these schools are developing a policy for weeding these materials. Project staff will develop "retrocon" routines suited to the weeding philosophy which emerges.

6.1.2 In September 1981 The York County Board of Education opened one "French Immersion school" and "French Immersion wings" in three other elementary schools. Their library collections are being processed by this project. French language learning materials held in other network schools are already being catalogued and PRECIS-indexed. However, there are different intellectual problems to be addressed when the program orientation is so dramatically different as is the case with the pupils who begin immersion in a second language in grade 1.

6.1.3 Elementary schools are still being added to the network. Two new schools constructed by The Y.C.B.E. were added this year. One new school is scheduled for 1982. In addition, the project is adding one school which has a new library addition and a substantial increase in its holdings. Building the secondary school data base needs attention by 1983.

6.2 As experience is gained with these undertakings, project staff learn the ins and outs of networking with clients having different situations and needs. As the project moves up its learning curve it draws ever closer to the time when an interboard network is viable. Provincial and national networks of school and public libraries should be feasible once the challenges of working across jurisdictions are overcome. Thereafter, networking with special libraries or other institutions in the public and private sector should be possible. The questions today are of the nature: "Who is ready to join us . . . and when do we start?" You, out there, can provide the answers.

USER: FORMAT
National Computerized Audiovisual Information System (National Film Board)

USE: Indexing of NFB films for print catalogue, COM, and an on-line database

CONTACT: Colin Neale
Coordinator
Distribution Services Division
National Film Board of Canada
3155 Cote de Liesse Road
Ville St. Laurent, Quebec

(514) 333-3480

The National Film Board makes use of the PRECIS software resident at UTLAS, for production of its print products and manipulation of the PRECIS string and uses its own developed software to provide on-line searching of the PRECIS string. FORMAT represents an example of a PRECIS application which accommodates on-line information retrieval, as well as the production of a print catalogue. Refer to the attached National Film Board literature for history, accomplishments and intentions of FORMAT, as well as the role of PRECIS.

"FORMAT"

NATIONAL COMPUTERIZED AUDIOVISUAL INFORMATION SYSTEM

National Film Board of Canada
Distribution Branch
Montreal, Quebec
May 1, 1982

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For further information, contact:

FORMAT
National Film Board of Canada
Distribution Branch D-13
P.O. Box 6100
Montreal, Quebec H3C 3H5
Tel. no. (514) 333-4524

INTRODUCTION

The National Film Board's involvement in the development of an automated information system for Canadian audio-visual materials is one of several wide-ranging initiatives concerned with improving the accessibility of these productions for users in the Canadian marketplace. Such initiatives have brought about for example a major restructuring of NFB library service to allow free film loan, the addition of Canadian Broadcasting Corporation/Radio-Canada programmes and many private sector 16MM films to the NFB's library network, and the introduction of a computerized nationwide booking/control system.

The information-providing initiative goes back to the mid-1970's, when a number of studies were undertaken to investigate the use of non-print media in Canadian educational institutions. The results of these studies, and the subsequent recommendations of a research project undertaken for NFB at Dalhousie University School of Library Service, formed the nucleus, in August 1976, of a much larger Task Force established by the Government Film Commissioner to study film information and distribution throughout Canada. Specifically, the Task Force was charged with the responsibility to design a workable and practical computer based information system which would encourage and facilitate the use of Canadian audio-visual products.

As a result therefore of much research and consultation, FORMAT is now in the early stages of its implementation and operation.

SYSTEM DEFINITION

FORMAT is a comprehensive database of Canadian audio-visual products. It is a computerized system which aims at assisting the Canadian film industry and community in the selection, acquisition and utilization of these products. Its design ensures the capacity to expand so as to provide for all Canadian-produced audio-visuals as well as stock shots, slides, etc. And, because input is handled according to the international format specifications of machine-readable cataloguing as adopted by the National Library of Canada, the System is compatible with those designed to handle print material and can be expanded to include film literature. The System is bilingual, capable of handling and producing information in both English and French.

This information is available through a variety of printed or COM (Computer Output Microform) catalogues which are produced from the machine-readable files, as well as being available on-line.

The on-line capacity of FORMAT is being implemented in two major ways. First of all, since the data is stored with the University of Toronto Library Automated Systems (UTLAS), all members of the UTLAS network have direct on-line access to the files. This capacity is most useful for public or school libraries which have acquired copies of audio-visual items and wish to incorporate the relevant information in their own catalogues or databases. Secondly, the information is being made available to all users by the placement of a sophisticated on-line inquiry system in NFB's 27

Regional Offices and in its U.S. Office in Chicago. The inquiry system, which will be operational across the country by late summer 1982, permits users to search for specific information by means of sixteen "selection criteria". These include title (a browseable search on any title word), series title (again a browseable search), language, type of AV material, color/b & w, date or date range, subject terms from the description, PRECIS specific subject terms, running time (specific or approximate), producer, and director. The booking/control system already in operation in these NFB Offices will then be integrated with the FORMAT inquiry system, enabling the terminal operator to select a film and book it for the user at the same time. As non-NFB collections are added to the database, production, distribution and availability information will be built up, so that eventually the outcome can be a list of Canadian non-print material complete with location codes and borrowing or sales information. This information can be marketed by means of general or specifically-requested print-outs, or if any Canadian institutions wish to gain access to the database through their own terminals, they will be able to do so by a variety of means.

FORMAT management is the responsibility of the Distribution Branch, Distribution Services Division. The Director of the Division has overall responsibility for the development of the System which includes inside and outside procedures to facilitate the input/output flow of data, negotiation for external services, and establishment of on-going communications with the Canadian film industry/community, Federal/Provincial/Municipal governments, organizations and non-Canadian markets where advantageous. The emphasis and thrust of the System is that of sharing and co-operation through broad external contacts with the Canadian film industry and community. This exchange of information has already influenced the development of the System, and will subsequently affect the Canadian audio-visual marketplace.

The needs of all potential users have been paramount throughout the design phase of FORMAT. Users have been identified as educators, librarians, media specialists, producers, directors, distributors, classrom teachers, home viewers, and others associated with the film community/industry, both in the public and the private sector. Users have been identified both on a national basis and internationally. As FORMAT is implemented, it is being tested on the basis of these users' needs, and will be re-designed if feedback indicates necessary areas for improvement.

Specific needs at the present time can be summed up as:

1) Listings of Canadian non-print materials
2) Subject and product indexes of Canadian non-print materials
3) Access to information (on-line and batch-mode)
4) Computer software compatibility
5) Publication of specialized catalogues
6) Indications of production trends
7) Dissemination of information on Canadian products
8) A central source for all information on Canadian audio-visual products

DATA GATHERING

The long-term value of the System ultimately depends upon the preparation and calibre of data input. The field of library media-science is complex and at the point of making tremendous breakthroughs, not only in this country, but also throughout the world. The Board has the expertise to carry out the function of information assembly, programme development, and dissemination of hard copy catalogues as well as direct on-line access. Priority will be given to material available nationally, by means of free loan, rental or sale. Material that is less accessible will take a lower priority.

The Preserved Context Index System (PRECIS), a sophisticated subject indexing system expressly designed for computer application and implemented internationally for both print and non-print materials, is being used to provide subject access to the film file. PRECIS is available as a printed subject index in the hard copy catalogues (see appendix A). It is also available on-line for the first time in a North American network as part of the inquiry system. PRECIS terms in on-line FORMAT can either be searched coordinately or in conjunction with other selection criteria.

The film records are stored in CAN/MARC format (Canadian version, machine-readable cataloguing) according to the latest specifications of the National Library of Canada.

In order to generate spin-off capacities and to ensure the use of the database beyond the immediate needs of all users, classification numbers from the Dewey Decimal, Universal Decimal, and Library of Congress classification systems are added to the record stored for each A/V product when these are available from other bibliographic sources.

OUTPUT OF THE SYSTEM

Information retrieval will be available to users in two output modes:

1) in batch-mode for special catalogue requests

    a) computer-generated hard-copy catalogues, both comprehensive and selective

    b) computer-output microform (COM)

    The above can be generated by means of the UTLAS software.

2) on-line

a) through terminals located across Canada in NFB offices (appendix B)

b) through UTLAS (appendix C)

c) available to other organizations in machine readable format

On-line output for all the information components is being made available on a gradual basis as capacities are developed. Phase 2 of the inquiry system is operational now. Phase 3 consists of the addition of the on-line PRECIS searching capability. Linkage of the inquiry system with the booking/control system, enabling chosen films to be stored in memory, searched in terms of regional availability for the dates requested, and then booked with no further key punching, is scheduled for Phase 4. Phases 5 and 6 have to do with Telidon-related projects now under negotiation.

Initially FORMAT on-line will generate data from a base consisting of NFB distributed products (first newly released and current, then retrospective), approximately 1,500 educational filmstrips, and from 800 to 1,000 films available from the Canadian Filmmakers' Distribution Centre (CFMDC) in Toronto. Pilot projects for data inclusion are now underway with the National Film, Television and Sound Archives and the Nova Scotia Public Archives, as well as a film-related printed materials pilot project with NFB's department of Research and Development of Policy. Eventually, the database will include information about all Canadian A/V products.

As FORMAT develops in terms of refined technical capabilities and the growth of the database, the opportunity will exist to de-bug and improve the System step by step.

For a full list of information available to users of FORMAT, see appendix D.

IMPLEMENTATION MODEL

FORMAT is being implemented according to a planned schedule as follows:

a) The collected information provides the material for the creation of the database records. These records will include in order of priority:

   i) - newly released NFB films - completed

   ii) - current NFB films - completed

   iii) - Non-NFB Canadian films - underway

   iv) - NFB Audio-Visual productions - completed & being updated

   v) - Non-NFB Audio-Visual productions - completed & being updated

vi) - NFB Archival films - data collection in process

vii) - Non-NFB Archival films - pilot projects underway

viii) - NFB Archival Audio-Visual productions - data collection in progress

ix) - Non-NFB Archival Audio-Visual productions.

b) All pertinent information is being collected on an especially designed data gathering sheet (see appendix F), with the exception of information obtained in a format which is already machine-readable.

POLLUTION. Environment
– Animated films
Air!
Paradise Lost.

POLLUTION. Freshwater biomes
Control
Freshwater World.

POLLUTION. Great Lakes
The Rise and Fall of the Great Lakes.
Control measures
The Great Clean-up.
The Great Lakes:
Only If You Care.

POLLUTION. Oceans
– Animated films
Deep Threat.

POLLUTION. Water resources. Third World
Water – the Hazardous Necessity.

POLYGONS
See also
SQUARES
TRIANGLES

POOR FAMILIES. North America
Social problems
The Things I Cannot Change.

POOR PEOPLE
See also
BEGGARS
POVERTY

POP MUSIC
See also
ROCK MUSIC

POPULAR MUSIC
See also
BALLADS
JAZZ

POPULAR MUSIC
- Film interpretations – Animated films
Street Musique.

POPULATION
See also
FAMILY PLANNING
HUMAN SETTLEMENTS
IMMIGRANTS

POPULATION. Urban regions. North America
Absence *– Experimental films*
23 Skidoo.

POPULATION CONTROL. Man
What on Earth Are We Doing?

PORNOGRAPHY
- Sociological perspectives
Not a Love Story:
A Film About Pornography.

PORTRAIT PAINTINGS
Canadian portrait paintings. Squires, Gerald
Portrait: Gerald Squires of Newfoundland.

PORTUGUESE SCHOONERS. Newfoundland
Fishing
The White Ship.

POST PARTUM DEPRESSION. New mothers
Post Partum Depression.

POSTAL SERVICES
Mail delivery, *ca. 1938*
News for the Navy.†

POSTAL SERVICES. Canada
- Experimental films
Mail Early.†
Christmas postal services *– Experimental films*
Mail Early For Christmas.†
Mail delivery *– Animated films*
A Tale of Mail.

POSTAL SERVICES. Great Britain
Airmail delivery *ca. 1939 – Experimental films*
Love on the Wing.†

POT *See* MARIJUANA

POTATOES. New Brunswick
Farming
Potatoes.

POTTERY
Earthware.
Techniques *– Stories – Children's films*
The Story of Peter and the Potter.

POVERTY
See also
BEGGARS

POVERTY. Point St. Charles. Montréal
The Point.

POVERTY. Population. Third World
Attitudes of governments *– Animated films*
Top Priority.

POWER
See also
POLITICAL POWER

POWER PUMPS
Use in control of forest fires *– Guides*
Fighting Forest Fires with Power Pumps.

POWER STATIONS
See also
NUCLEAR POWER STATIONS

PRAIRIE PROVINCES
See also
ALBERTA
MANITOBA
SASKATCHEWAN

PRAIRIE PROVINCES
Farming, *1930-1939.* Life styles. Childhood memories
Prairie Album.
Wheat. Farming
The Changing Wheat Belt.

PRAIRIE PROVINCES. Special subjects. Kurelek, William. Canadian paintings
Kurelek.

PRAIRIES. North America
Buffalo. Hunting, *ca. 1850*
Age of the Buffalo.

PRE-FABRICATED RESERVOIRS
Construction
Reservoir.

PRECIOUS METALS
See also
GOLD

PRECIPITATION. Weather
See also
SNOWFLAKES

PREGNANCY
See also
CHILDBIRTH
CONTRACEPTION

PREGNANCY
Role of nutrition
You're Eating for Two.

PREGNANCY. Adolescents
– Stories
Phoebe.

PREHISTORIC REPTILES
See also
DINOSAURS

PREJUDICE
See also
BIGOTRY
DISCRIMINATION

PREJUDICE
Exposure by children *– Dramatizations*
Teach Me to Dance.

PREMIERS. Québec
Johnson, Daniel *- Biographies*
The Inheritance.
Lévesque, René *- Biographies*
The Champions.

PRESERVATION
See also
CONSERVATION

PRESIDENTS. Chile
Allende Gossens, Salvador. Political views
Salvador Allende Gossens: A Testimony.

PRESS
See also
JOURNALISTS
NEWSPAPERS

PRESS AGENCIES
Multinational press agencies. Monopolies on information on the Third World *– Study examples: Africa*
Distorsions.

PRICE CONTROLS
Role in economy during war *– Animated films*
Dollar Dance.†

PRIMARY COLORS
Introduction *– Children's films – Animated films*
The Little Men of Chromagnon.

PRIME MINISTERS. Canada
Diefenbaker, John
"Dief"!
Trudeau, Pierre Elliott. Participation in politics, *to 1977*
The Champions.

PRISON LIFE
Effects on prisoners
Cell 16.

PRISON LIFE. Canada
– Animated films
Prison.

PRISONERS. British Columbia
Rehabilitation *– Study examples: Seventh Step Society*
The Seventh Step to Freedom.

PRISONERS OF WAR. Japanese internment camps. World War 2
Canadian prisoners of war *– Personal experiences – Feature films*
A War Story.

PRISONS
See also
CONCENTRATION CAMPS
INTERNMENT CAMPS

PROBLEMS
See also
SOCIAL PROBLEMS

PROCESSIONS
See also
MARCHES

PROCRASTINATION
– Humorous treatment – Animated films
Getting Started.

PRODUCTION
See also
INDEPENDENT PRODUCTION

PROFESSIONAL TEAMS. Hockey. Québec
Nordiques
Just Another Job.

PROFESSIONAL WRESTLING
Wrestling.

PROGRAMS
See also
EXCHANGE PROGRAMS
TELEVISION PROGRAMS

PROLETARIAT *See* WORKING CLASS

PROPORTIONS
– Animated films
Dimensions.

PROSPECTORS. Vancouver Island
Life styles
David and Bert.

PROSTHESES *See* ARTIFICIAL LIMBS

ENVIRONNEMENT
Voir aussi
ÉCOLOGIE
TERRES

ENVIRONNEMENT
Pollution – *Films d'animation*
Le Bleu perdu.

ENVIRONNEMENT. Canada
Pollution. Attitudes de la société
Une question d'attitudes.

ENVIRONNEMENT. Nord du Québec.
Effets du développement hydro-électrique de la Baie James
Baie James: environnement et écologie.

ENVIRONNEMENT CANADA *Voir* **CANADA.** *Environnement Canada*

ÉPOUSES
Voir aussi
FEMMES À LA MAISON

ÉPOUSES. Prisonniers québécois. Colombie-Britannique
– *Expériences personnelles*
Mur de verre.

ÉQUITATION
Voir aussi
CARROUSEL
CHEVAUX
SELLIERS

ÉRUPTIONS. Kilauea. Volcans. Hawaii
1955, 1959-1960
Éruption au Kilauea, aux îles Hawaii.

ESCALADE DE GLACIER. Pilier de Cristal. Montmorency (*chute*). Québec
Le Pilier de Cristal.

ESCALADE DE ROCHER. Val-David. Laurentides. Québec
Les Rochassiers.
Techniques – *Films éducatifs*
Initiation à l'escalade.

ESCLAVAGE. Noirs. Michigan
1851
Frontière de la liberté.

ESCRIME
Sabre et Fleuret.

ESPACE INTERPLANÉTAIRE
Voir aussi
EXTRA-TERRESTRES
SYSTÈME SOLAIRE
TECHNOLOGIE SPATIALE
UNIVERS

ESPACE INTERPLANÉTAIRE
Recherche scientifique. Utilisation de la spectroscopie
Herzberg.
Voyages – *Films d'animation*
Notre univers.

ESPAGNE
Guerre civile d'Espagne, *1936-1939.* Participation des militaires canadiens
Les « Canadienses ».
Madrid. Guerre civile d'Espagne. *1936-1939*
Defense of Madrid.

ESPIONS QUÉBÉCOIS
« IXE-13 ». Aventures – *Films de fiction – Comédies*
Ixe-13.

ESPRIT *Voir* **PENSÉE**

ESQUIMAUX *Voir* **INUIT**

ESTOMAC
L'Estomac.

ÉTANGS
Insectes et animaux. Cycles de vie
L'Étang.

ÉTATS *Voir* **GOUVERNEMENTS**

ÉTATS-UNIS
Voir aussi
Les entrées aux noms des différents États
TOURISTES AMÉRICAINS

ÉTATS-UNIS
Féministes américaines – *Témoignages*
Quelques féministes américaines.
Mouvements féministes. Histoire
L'Essor féminin.
Société contemporaine – *Perspectives sociologiques*
Voir Miami.

ÉTÉ. Québec
... Et Dieu créa l'été.
Le Québec au temps des étés.

E.T.G.A. Programmes internationaux. Recherche scientifique. Météorologie
Opération E.T.G.A. Rôle du Canada
Opération E.T.G.A.

ETHNOCIDES. Indiens Otomis. Mexique
Ethnocidio.

ETHNOLOGIE
Voir aussi
GROUPES ETHNIQUES
RACES HUMAINES

ETHNOLOGUES QUÉBÉCOIS
Barbeau, Marius. Points de vue sur la mythologie des Indiens du Canada
Marius Barbeau et l'Art totémique.
Barbeau, Marius. Points de vue sur les arts populaires québécois
Marius Barbeau et le Folklore canadien-français.

ÉTOILES. Formes géométriques
– *Films d'animation – Films expérimentaux*
Étoiles et Bandes.

ÉTRANGERS. Régions rurales. Québec
Peur des étrangers – *Films de fiction*
L'Héritage.

ÊTRES VIVANTS
Voir aussi
ANIMAUX
EMBRYONS
MICRO-ORGANISMES

ÉTUDIANTS
Voir aussi
ÉLÈVES

ÉTUDIANTS
Critiques de l'école
Pour un bout de papier.
Formation pour les carrières dans la Garde côtière canadienne
La Garde côtière canadienne (D'étudiant à commandant).

ÉTUDIANTS. CEGEPS. Québec
– *Témoignages*
« C'est votre plus beau temps ».

ÉTUDIANTS ACADIENS. Écoles secondaires. Nouveau-Brunswick
Une simple journée.

ÉTUDIANTS ACADIENS. Université de Moncton. Moncton. Nouveau-Brunswick
Revendications culturelles et politiques
L'Acadie, l'Acadie.

ÉTUDIANTS QUÉBÉCOIS
Voir aussi
ÉCOLES SECONDAIRES. Québec

ÉTUDIANTS QUÉBÉCOIS. Écoles secondaires
Orientation professionnelle
Un jeu de hasard.

EUROPE
Voir aussi
Les entrées aux noms des différents pays

EUROPE
OTAN. Rôle
Quatre jours en automne.
Renaissance
Jean Cabot, navigateur.

EUROPE DE L'OUEST
Défense par l'OTAN
Borealis.
OTAN. Rôle des Forces armées canadiennes
Sentinelles de l'Occident.

EUTHANASIE
Responsabilités des médecins. Points de vue du sociologue Ziegler, Jean
Avec Jean Ziegler, sociologue.

ÉVANGILES *Voir* **BIBLE.** *Nouveau Testament. Évangiles*

ÉVASION FISCALE. Impôt sur le revenu. Canada
Conséquences – *Films de fiction*
L'Affaire Sloane.

ÉVÊQUES. Église catholique. Montréal
Charbonneau, Joseph – *Biographies*
Joseph Charbonneau: sixième évêque de Montréal.

ÉVOLUTION
Voir aussi
GÉNÉTIQUE
ORIGINES DE LA VIE

ÉVOLUTION
– *Exemples étudiés. Fossiles*
Images des mondes perdus.

ÉVOLUTION. Homme
Le Défi du devenir.
– *Films d'animation*
Évolution.
Apparition des outils
L'Origine de l'homme – Les Outils.

ÉVOLUTION GÉOLOGIQUE. Arctique. Canada
Recherche scientifique
L'Extrême-Nord canadien: le visage du pays.

ÉVOLUTION GÉOLOGIQUE. Canada
Recherche scientifique. Rôle de la Commission géologique du Canada
Le Passé vivant.

ÉVOLUTION GÉOLOGIQUE. Écorce terrestre. Amérique du Nord
Richesses de la terre.

EXAMENS. Écoles secondaires. Québec
56 700 minutes.

EXCURSIONS *Voir* **VOYAGES**

EXERCICES PHYSIQUES
Joie de vivre.

EXETER (*cathédrale*). *Exemples étudiés*
Angleterre. Architecture gothique. Cathédrales
La Cathédrale d'Exeter.

EXILÉS *Voir* **RÉFUGIÉS POLITIQUES**

EXISTENCE
Voir aussi
VIE

EXISTENCE
Aspects éphémères
Le Château de sable.
Clair – obscur.
Étapes – *Films d'animation*
Premiers jours.
Signification
Les Allées de la terre.
L'Homme nouveau.

EXPÉDITIONS
Voir aussi
EXPLORATION

EXPÉDITIONS. Nahanni (*rivière*). Territoires du Nord-Ouest
La Nahanni.

EXPÉDITIONS ARCHÉOLOGIQUES SOUS-MARINES. Terre-Neuve
L'Énigme du Saphir.

EXPÉDITIONS MARITIMES. Arctique. Canada
1969. Brise-glace. « John A. Macdonald »
Passage au Nord-Ouest.
1969. Pétroliers. « Manhattan »
Passage au Nord-Ouest.

EXPÉDITIONS MÉDICALES CANADIENNES
Recherche scientifique sur la population de l'île de Pâques
Expédition à l'île de Pâques.

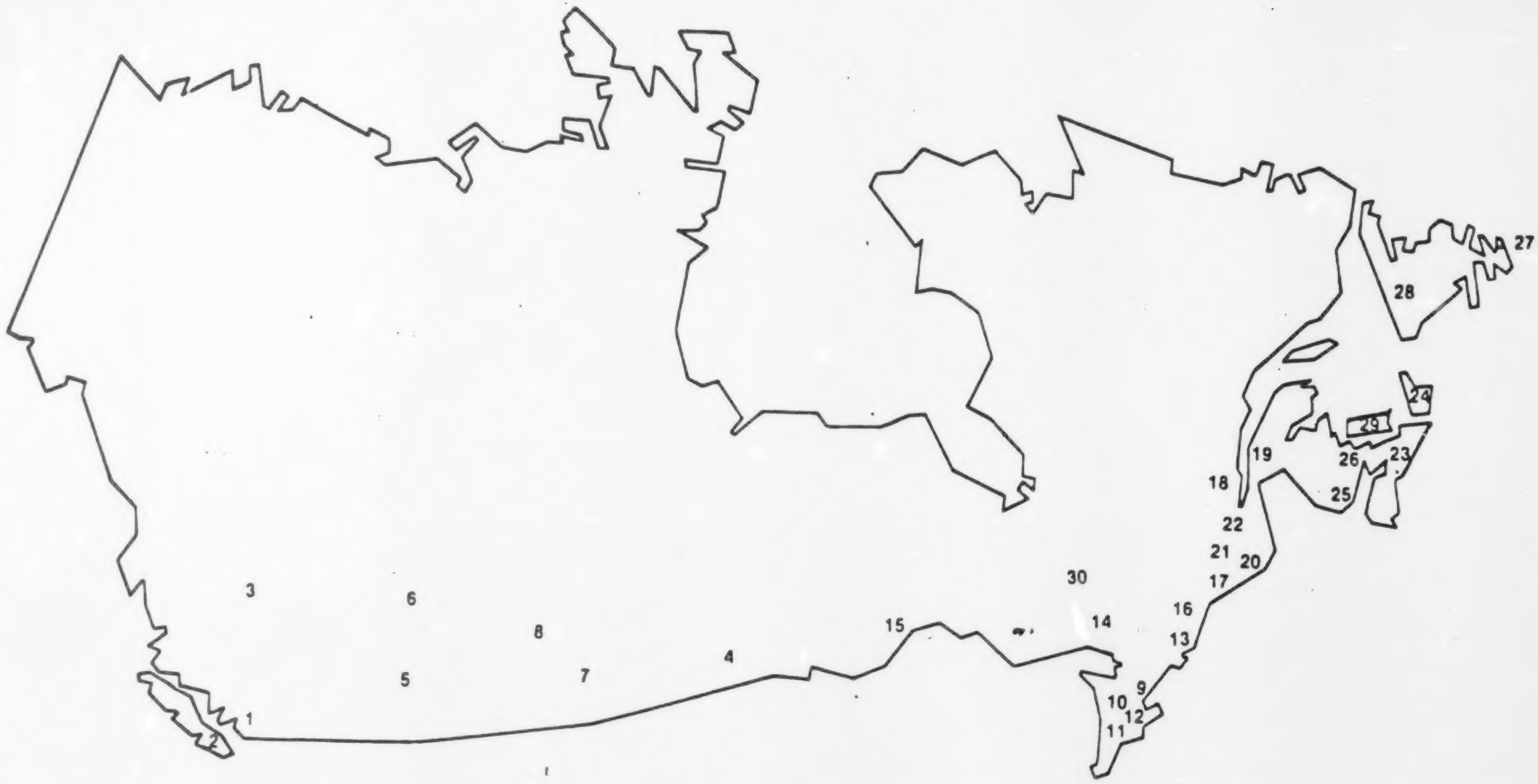
EXPÉRIENCE CRÉATRICE *Voir* **CRÉATIVITÉ**

EXPLOITATION MINIÈRE
Voir aussi
INDUSTRIE MINIÈRE
PROSPECTION

EXPLORATEURS
Voir aussi
VOYAGEURS

EXPLORATION
Voir aussi
PROSPECTION

Appendix B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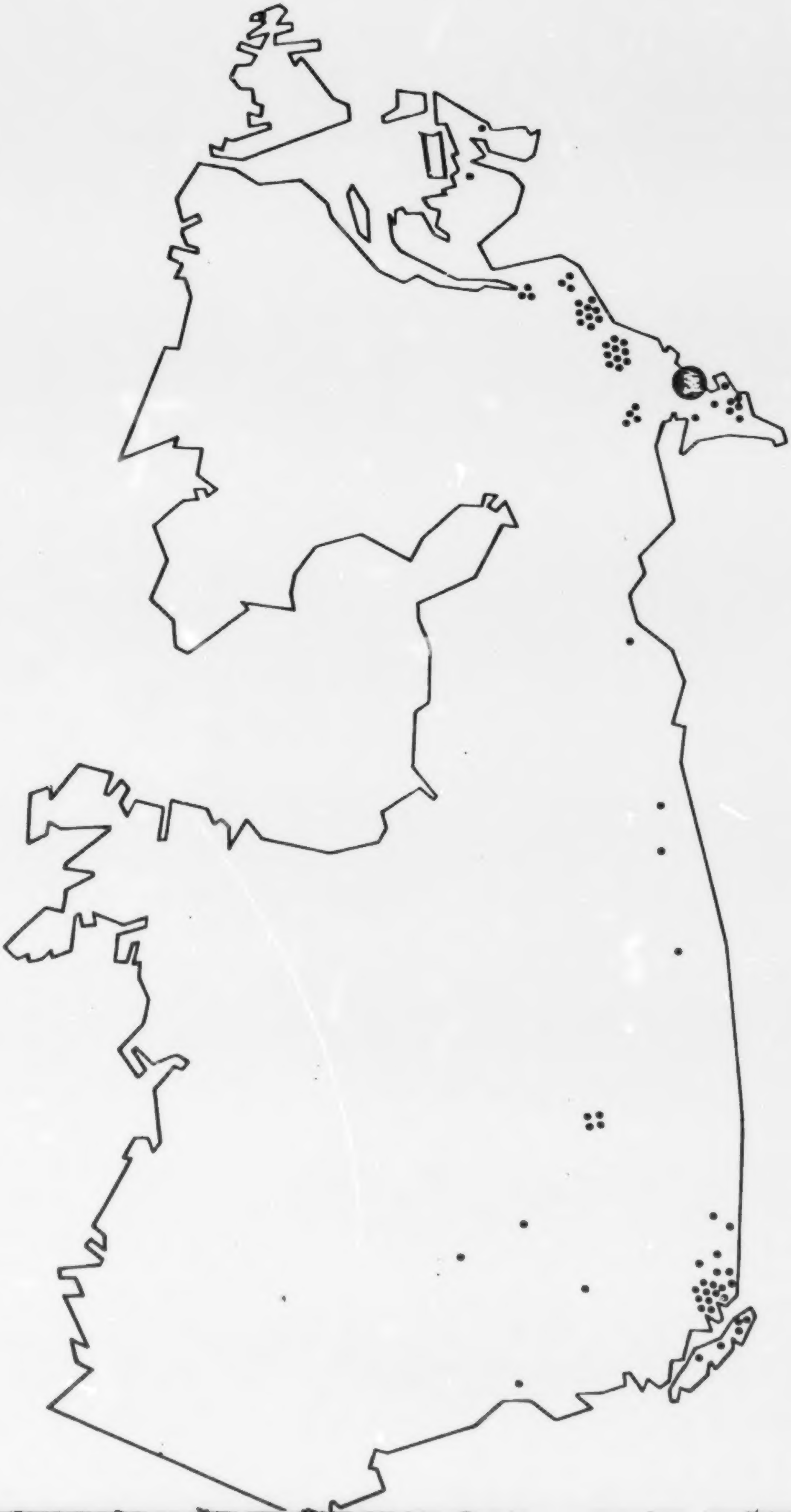
NFB Libraries and Offices in Canada

1	Vancouver
2	Victoria
3	Prince George
4	Winnipeg
5	Calgary
6	Edmonton
7	Regina
8	Saskatoon
9	Toronto
10	Kitchener
11	London
12	Hamilton
13	Kingston
14	North Bay
15	Thunder Bay
16	Ottawa
17	Montréal
18	Chicoutimi
19	Rimouski
20	Sherbrooke
21	Trois-Rivières
22	Québec
23	Halifax, N.S.
24	Sydney, N.S.
25	St. John, N.B.
26	Moncton
27	St. John's, Nfld.
28	Corner Brook, Nfld.
29	Charlottetown, P.E.I.
30	Noranda

Appendix C



UT/LAS Clients in Canada

Appendix D

RECORD CONTENT

FORMAT users will be able to search the database to obtain the following information about each item:

A. A fixed core of information available upon date of release.

		MARC TAG
* 1)	Film Identification Number (NFB films)	035
* 2)	Inputting agency	040
* 3)	Release title	245
* 4)	Series title	440
* 5)	Programme title	711
* 6)	Type of AV material	ff66

* Information fields with an asterisk (*) are "selection criteria" in the on-line system, which means that this information can be accessed directly on-line either on its own as in combination. All of the information listed above can be displayed on the screen, or included in a print-out, once a selection is made.

* 7)	Language of cataloguing (either English or French at present)	ff17
8)	Government production	ff10
9)	Alternate language title, series title	512, 840
* 10)	Producing institution or organization	ff5
11)	Country of production	260$b
12)	Sponsor(s)	260$c
13)	Production dates	ff2,3,4
* 14)	Date of release	260$c, ff2
* 15)	Colour/B&W	ff24
* 16)	Running time	308
17)	Other physical description, eg. number & size of reels; sound; 16 or 35mm	300/500
18)	Technique, eg. animation, live action documentary, fiction, etc.	ff70

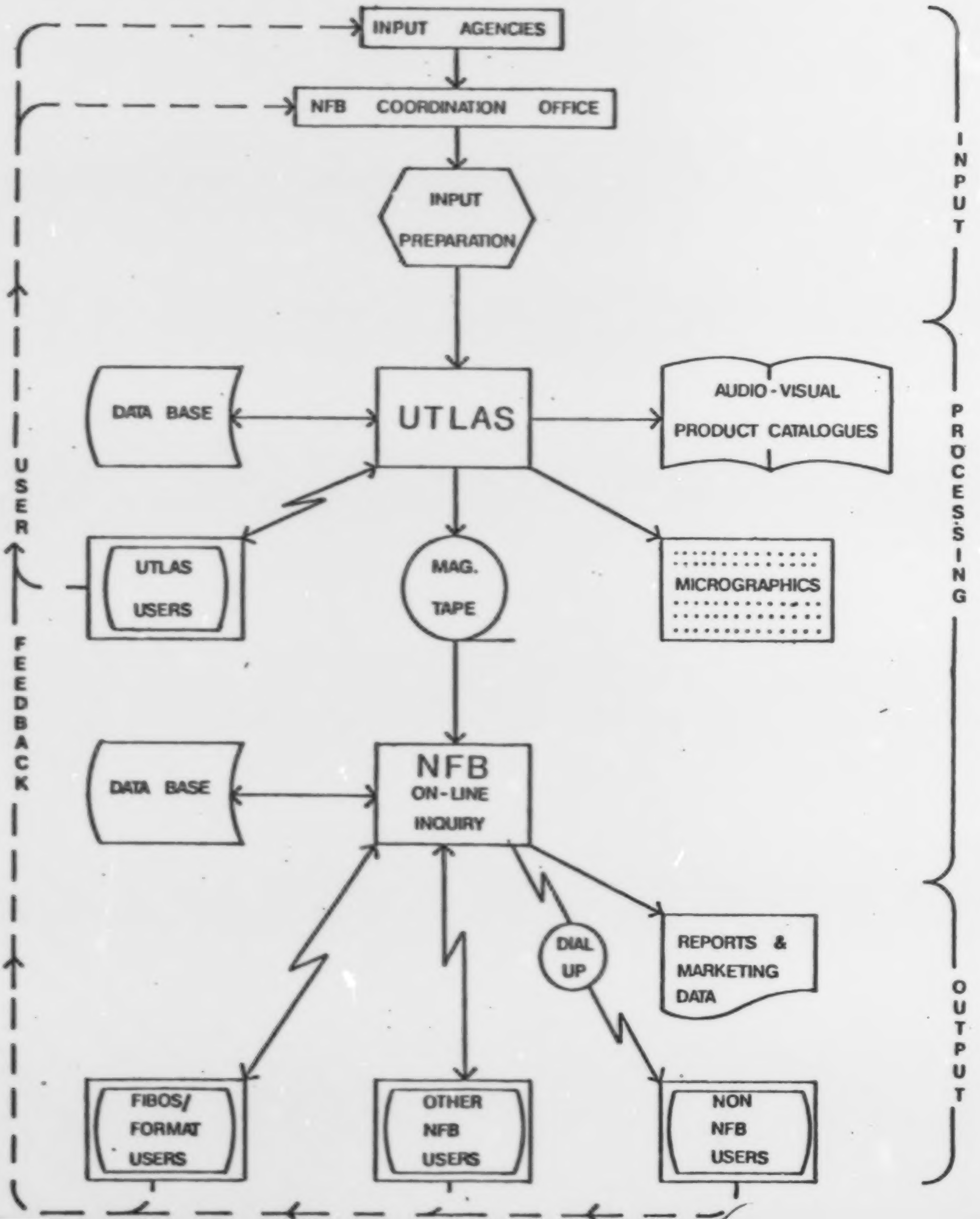
19) Credits	
* Producer; * Director; Editor; Script; Camera; Music; Narration	508/700
20) Cast	511
* 21) Description or abstract	520
22) Bibliographic history note	503
* 23) PRECIS indexing	690/692

B. A second level of information which needs frequent revision to remain up-to-date, is also included:

* 1) Active/Archival status	090
2) Restricted use notes	506
3) Citations of reviews	510
* 4) Awards	at concl. of 520
5) Accompanying materials	300/500
* 6) Distributors - sales, rental, loan	265

FORMAT

CANADIAN AUDIO-VISUAL PRODUCTS INFORMATION SYSTEM


INPUT AGENCIES
NFB COORDINATION OFFICE
INPUT PREPARATION
DATA BASE
UTLAS
AUDIO-VISUAL PRODUCT CATALOGUES
UTLAS USERS
MAG. TAPE
MICROGRAPHICS
DATA BASE
NFB ON-LINE INQUIRY
DIAL UP
REPORTS & MARKETING DATA
FIBOS/ FORMAT USERS
OTHER NFB USERS
NON NFB USERS
USER FEEDBACK
INPUT
PROCESSING
OUTPUT

USER: Control Data Corporation (producers of PLATO Systems)

USE: Indexing PLATO courseware for the PLATO on-line catalogue

CONTACT: Nancy Vernon
Manager
Published Courseware Delivery
Control Data Corporation
8100 34th Avenue South
Box 0
Minneapolis, Minnesota
55440

(612) 853-3236

PRECIS has been used to index about 1,300 records of educational software. A staff of four indexers processes 50-60 courseware items per year. The head indexer does not have a traditional library background. The resulting database is intended as a marketing tool and is searchable on-line by PLATO users. Cataloguing and indexing are done on-line, eliminating coding of forms and subsequent keypunching. A print catalogue of PLATO materials is also available, but is produced completely independently of the database (reasons were not apparent) and does not employ the PRECIS indexing method. The type of data included in PRECIS strings relates to subject content, instructional mode (game, drill and practice) and a library designation specific to the PLATO organization (academic, curriculum design, etc.)

The following procedure is used by an indexer in the cataloguing and indexing of PLATO courseware:

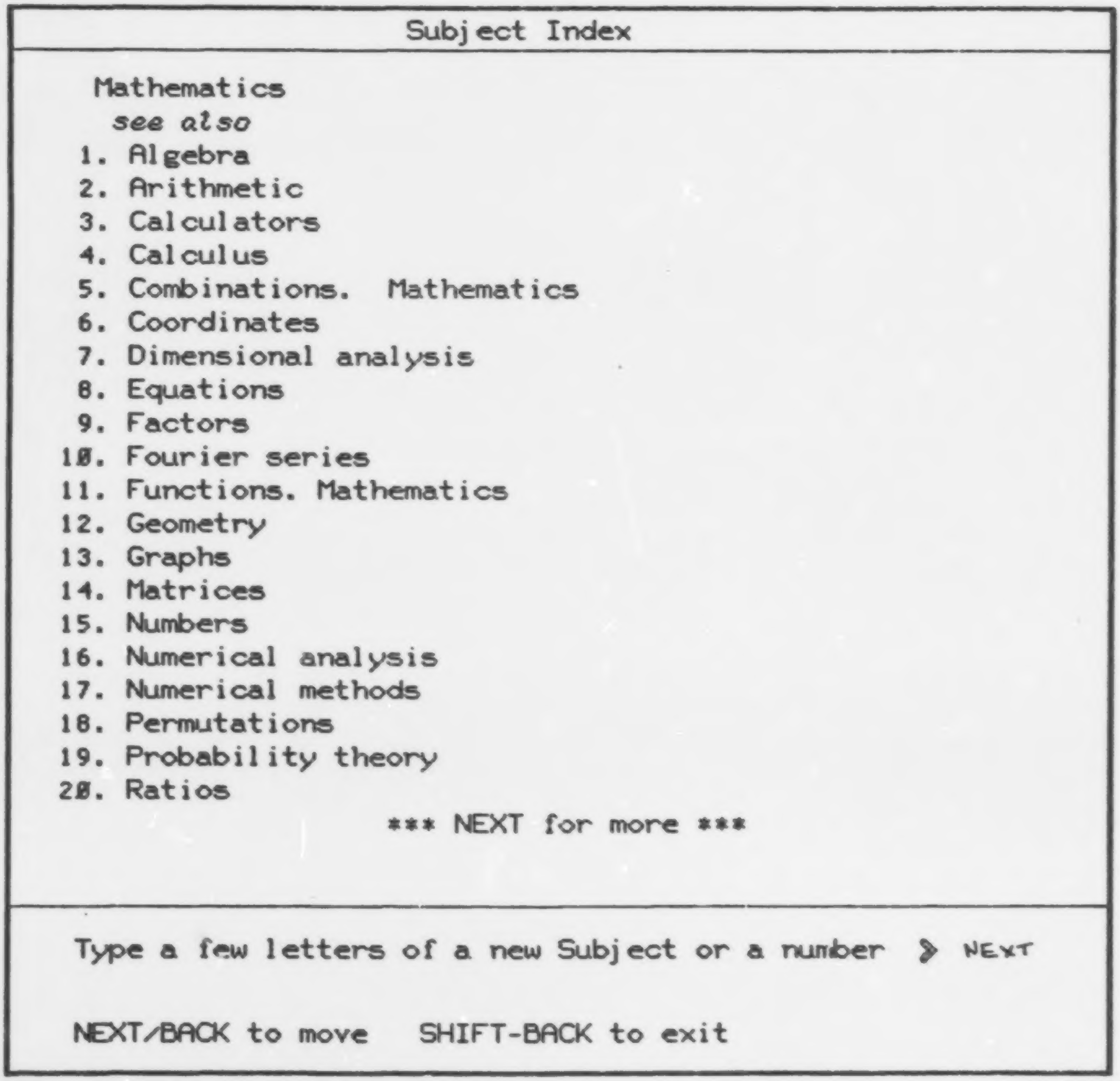
1. Examine documentation (marketing and support material) of a new piece of courseware
2. Derive bibliographical details (author, titles, etc.)
3. Write abstract
4. List possible PRECIS terms (descriptions of content)
5. Consult on-line catalogue for similar courseware and compare terms generated in 4
6. Consult authority file (available on microfiche produced by British National Library) to verify that selected terms exist in file and to make _see_ and _see also_ reference to synonymous terms (Because of the new nature of much of the materials, new terms are often created)
7. Construct PRECIS string
8. Enter data generated in 1-7 on-line

General comments about PRECIS and its use at PLATO included:

1. The on-line catalogue is very user-friendly
2. PRECIS' natural language system represented an advantage over traditional subject classifications because much of the subject material documented is "newer than the traditional subject headings"
3. PLATO courseware is heavily concentrated in sciences and computer disciplines. PRECIS allowed the desired level of specificity in these areas
4. PRECIS is sometimes _too_ specific; thus a list of about 30 general subject headings (curriculum titles) was developed
5. PRECIS training is difficult to acquire (Mary Dykstra at Dalhousie University is the only Canadian capable of giving training workshops in PRECIS).

Please refer to the following material from Control Data Corporation for a print copy of a typical on-line search.

Subject index as seen by a user who enters the term "mathematics"



```
                    Subject Index

  Mathematics
   see also
  1. Algebra
  2. Arithmetic
  3. Calculators
  4. Calculus
  5. Combinations.  Mathematics
  6. Coordinates
  7. Dimensional analysis
  8. Equations
  9. Factors
 10. Fourier series
 11. Functions. Mathematics
 12. Geometry
 13. Graphs
 14. Matrices
 15. Numbers
 16. Numerical analysis
 17. Numerical methods
 18. Permutations
 19. Probability theory
 20. Ratios
                 *** NEXT for more ***

 Type a few letters of a new Subject or a number  > NEXT

 NEXT/BACK to move   SHIFT-BACK to exit
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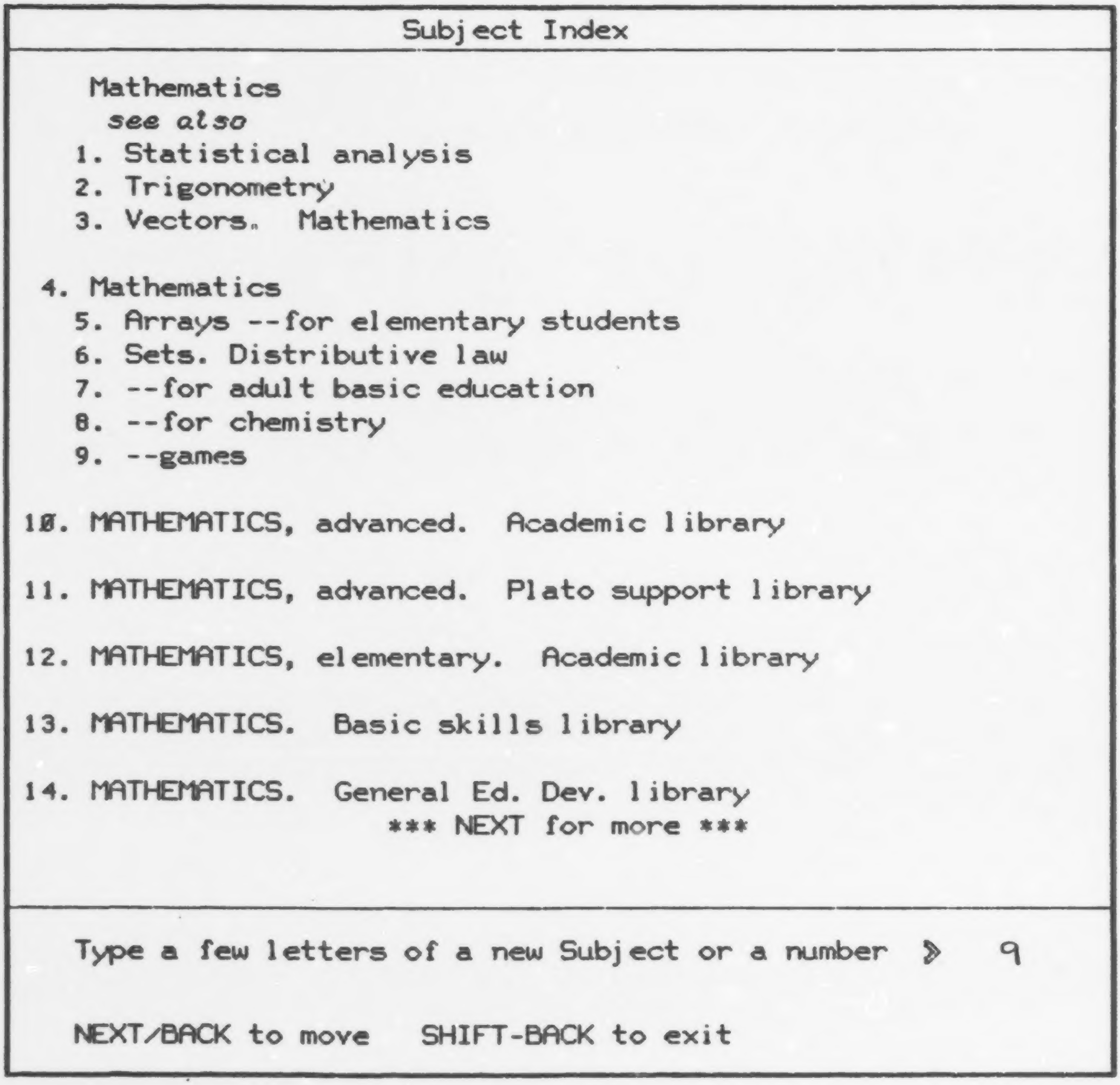
We'll assume the user chooses "games".



```
                         Subject Index

    Mathematics
     see also
   1. Statistical analysis
   2. Trigonometry
   3. Vectors.  Mathematics

 4. Mathematics
   5. Arrays --for elementary students
   6. Sets. Distributive law
   7. --for adult basic education
   8. --for chemistry
   9. --games

10. MATHEMATICS, advanced.  Academic library

11. MATHEMATICS, advanced.  Plato support library

12. MATHEMATICS, elementary.  Academic library

13. MATHEMATICS.  Basic skills library

14. MATHEMATICS.  General Ed. Dev. library
                       *** NEXT for more ***

   Type a few letters of a new Subject or a number  »  9

   NEXT/BACK to move   SHIFT-BACK to exit
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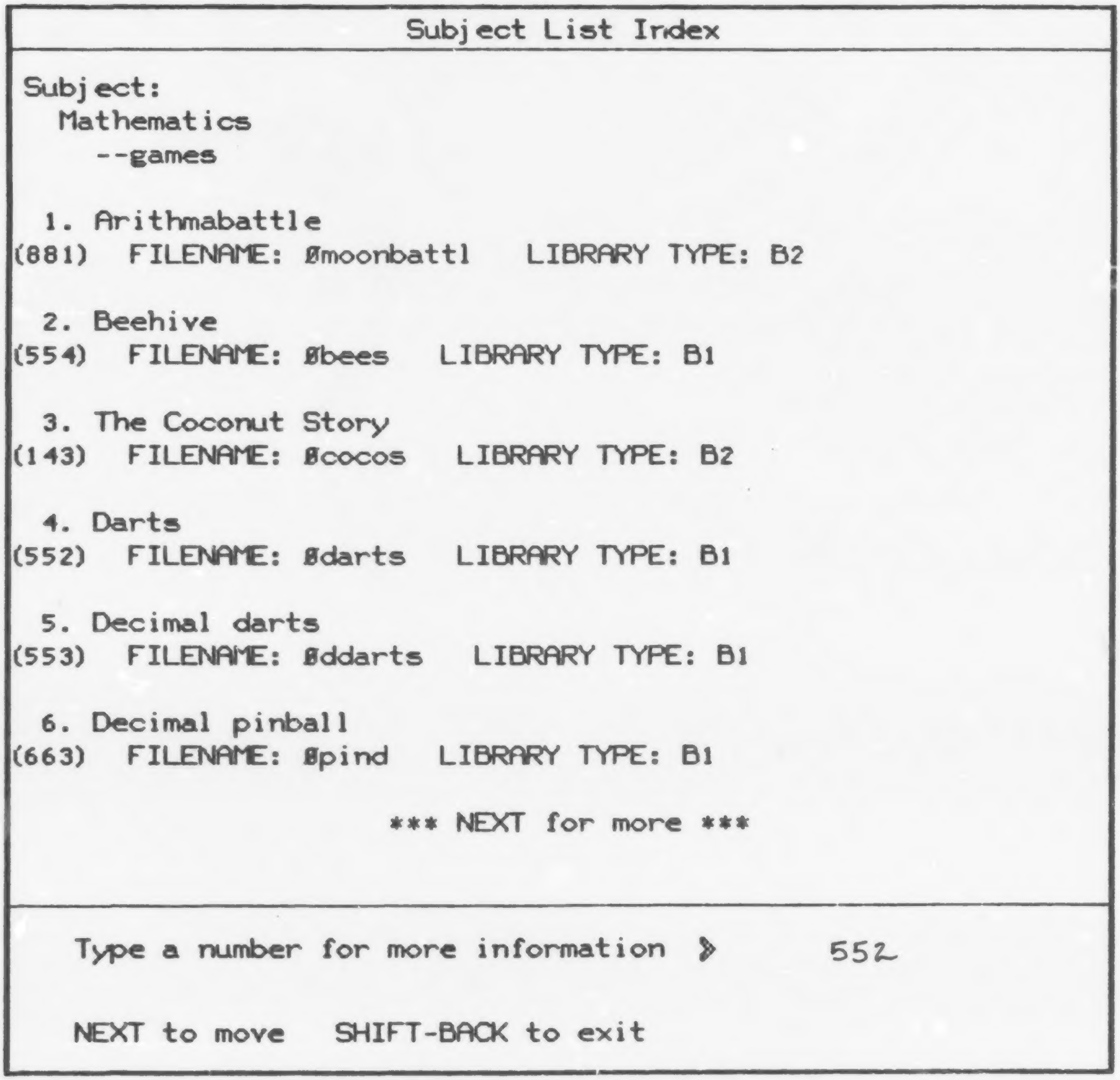


```
                    Subject List Index

Subject:
  Mathematics
    --games

 1. Arithmabattle
(881)  FILENAME: 0moonbattl   LIBRARY TYPE: B2

 2. Beehive
(554)  FILENAME: 0bees   LIBRARY TYPE: B1

 3. The Coconut Story
(143)  FILENAME: 0cocos   LIBRARY TYPE: B2

 4. Darts
(552)  FILENAME: 0darts   LIBRARY TYPE: B1

 5. Decimal darts
(553)  FILENAME: 0ddarts   LIBRARY TYPE: B1

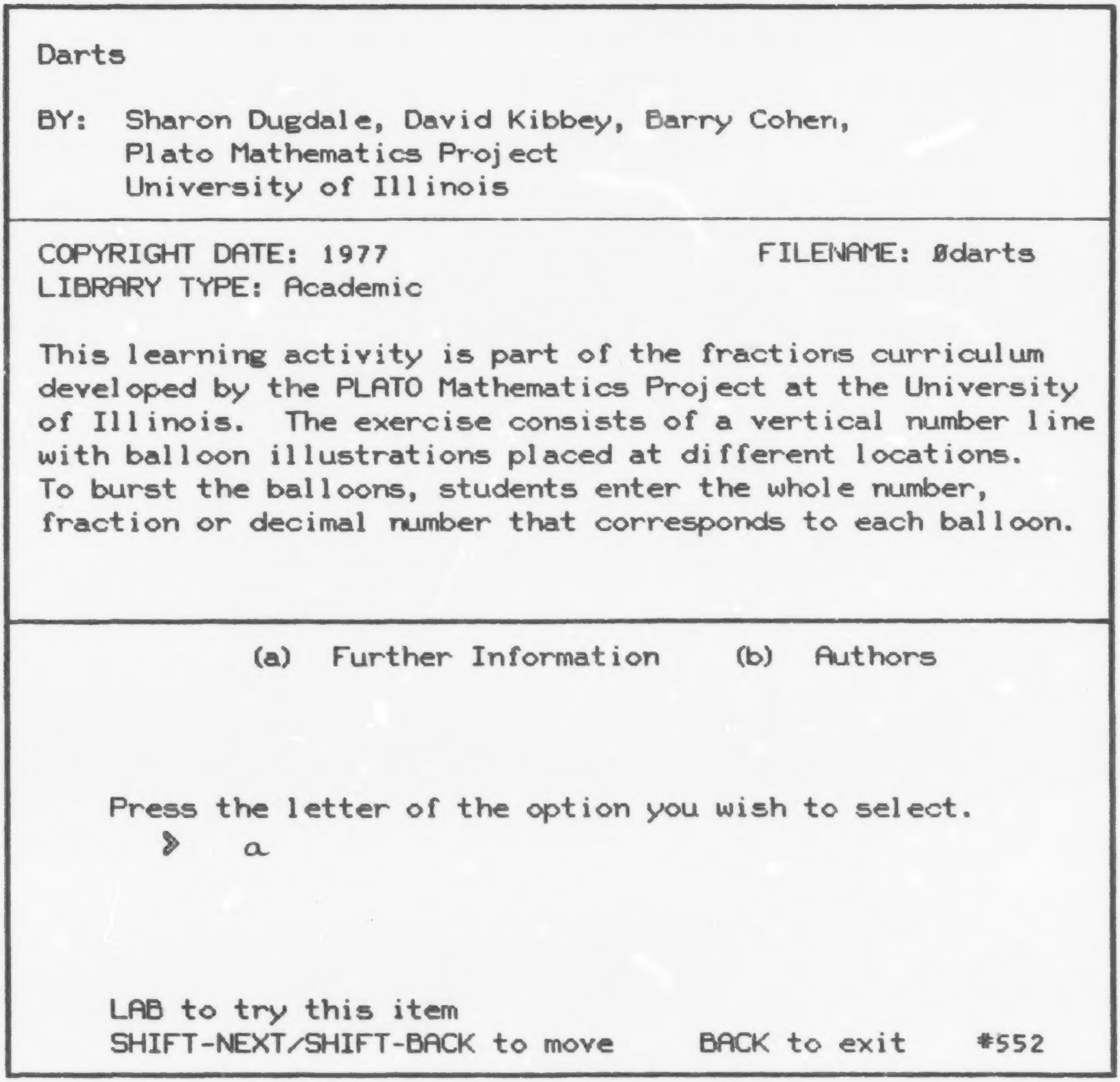
 6. Decimal pinball
(663)  FILENAME: 0pind   LIBRARY TYPE: B1

                    *** NEXT for more ***

   Type a number for more information >>      552

   NEXT to move   SHIFT-BACK to exit
```

This is the entry the user sees.



```
Darts

BY:  Sharon Dugdale, David Kibbey, Barry Cohen,
     Plato Mathematics Project
     University of Illinois

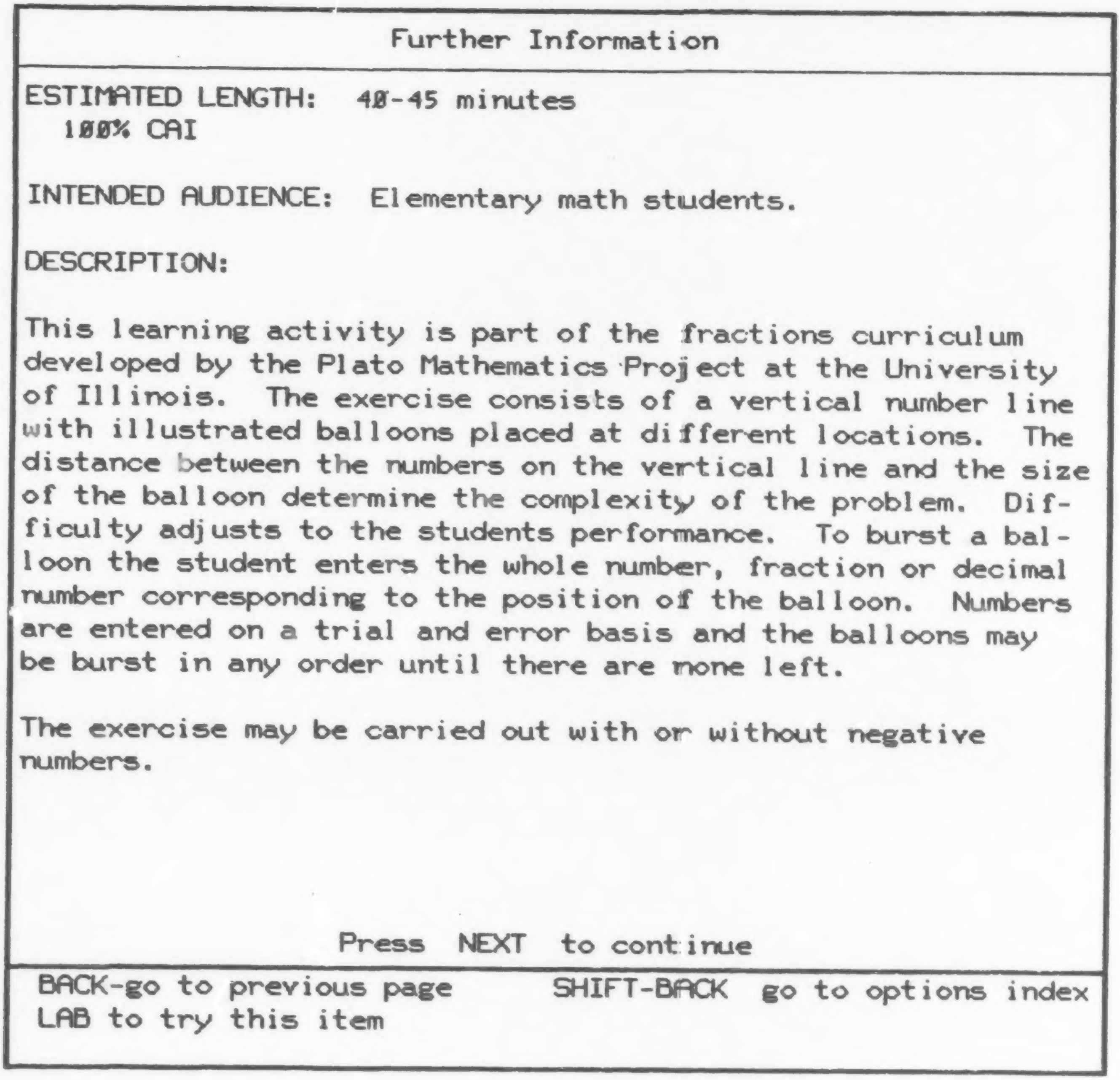
COPYRIGHT DATE: 1977                      FILENAME: 0darts
LIBRARY TYPE: Academic

This learning activity is part of the fractions curriculum
developed by the PLATO Mathematics Project at the University
of Illinois.  The exercise consists of a vertical number line
with balloon illustrations placed at different locations.
To burst the balloons, students enter the whole number,
fraction or decimal number that corresponds to each balloon.

            (a)  Further Information     (b)  Authors


    Press the letter of the option you wish to select.
       >    a


    LAB to try this item
    SHIFT-NEXT/SHIFT-BACK to move     BACK to exit    #552
```



Further Information

ESTIMATED LENGTH: 40-45 minutes
100% CAI

INTENDED AUDIENCE: Elementary math students.

DESCRIPTION:

This learning activity is part of the fractions curriculum developed by the Plato Mathematics Project at the University of Illinois. The exercise consists of a vertical number line with illustrated balloons placed at different locations. The distance between the numbers on the vertical line and the size of the balloon determine the complexity of the problem. Difficulty adjusts to the students performance. To burst a balloon the student enters the whole number, fraction or decimal number corresponding to the position of the balloon. Numbers are entered on a trial and error basis and the balloons may be burst in any order until there are none left.

The exercise may be carried out with or without negative numbers.

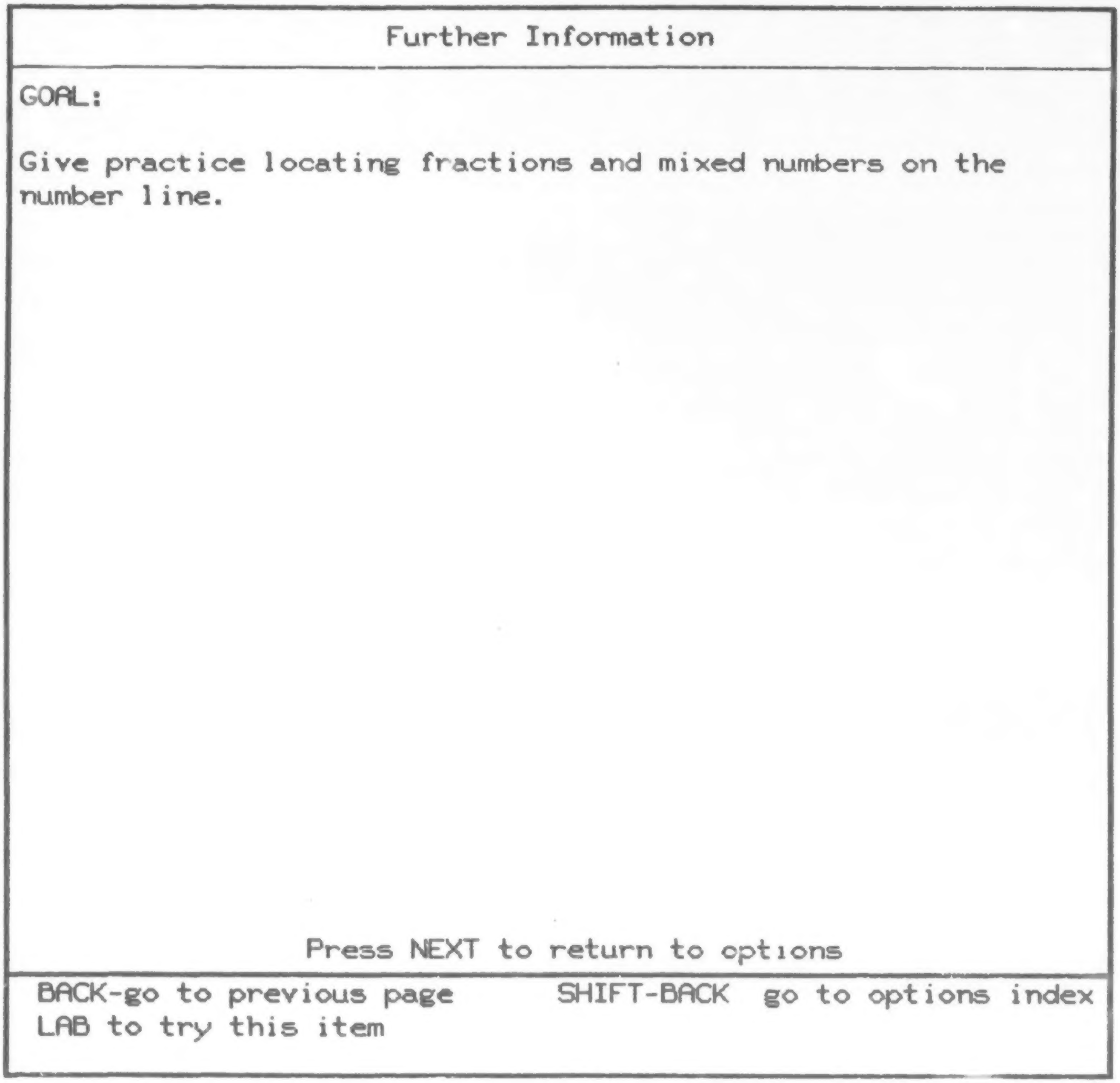
Press NEXT to continue
BACK-go to previous page
SHIFT-BACK go to options index
LAB to try this item

This is the same entry as seen in the database editor.

```
                                                  963 words left
                      Catalog of Available Courseware
                                 (index)

                            Master Card #552

   a.  Title*                              j.  Subjects*
   b.  Authors*                            k.  Package Mode
   c.  Author Affiliation*                 l.  Library Type*
   d.  COPYRIGHT date*
                                           m.  General Ordering Info
   e.  Main File Name*                     n.  General Ordering (cont)
   f.  Demo File Name                      o.  text3
   g.  Related Files                       p.  text4
                                           q.  text5
   h.  Short Abstract*                     r.  text6
   i.  Long Abstract*                      s.  text7
                                           t.  text8
  Press LAB  to see mastercard        SHIFT-COPY to store any changes
                                      SHIFT-DATA other options
        * = Data Entered
 ------------------------------------------------------------------
  LAST ED: reina/coserv  02/03/78  11.03.30.
```



Further Information

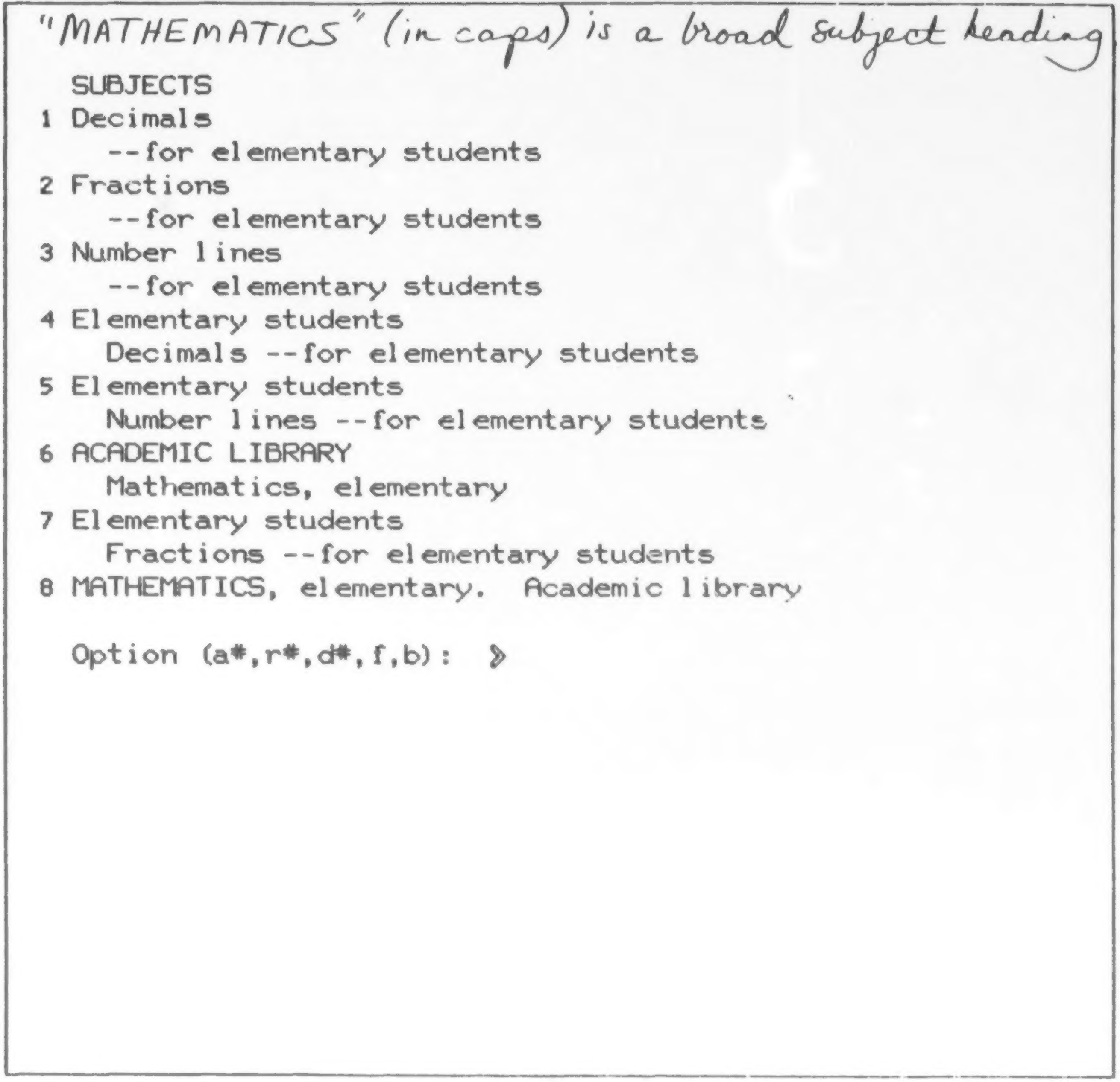
GOAL:

Give practice locating fractions and mixed numbers on the number line.

Press NEXT to return to options

BACK-go to previous page SHIFT-BACK go to options index
LAB to try this item

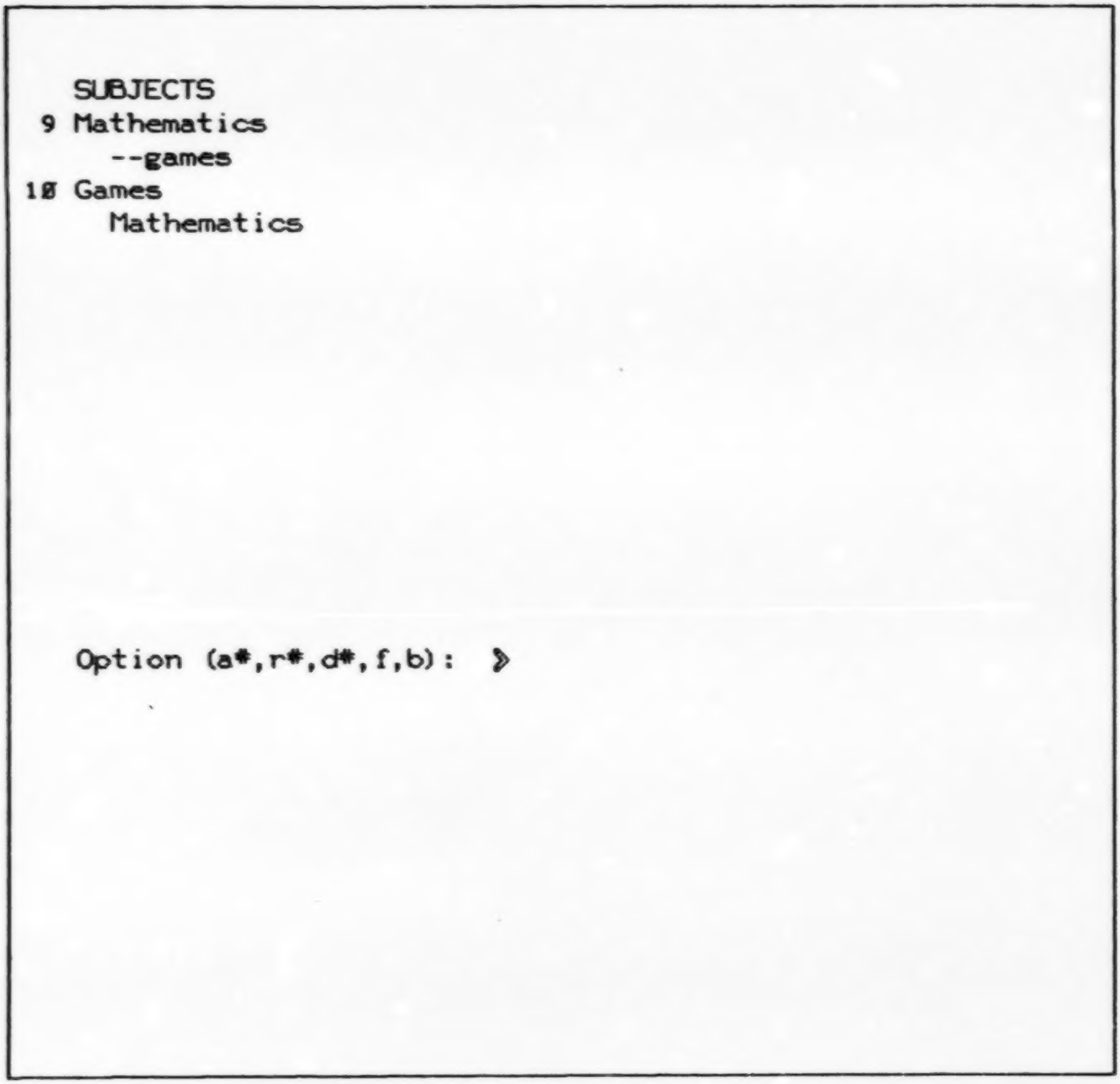
These are the strings for this entry.
"Academic Library" is our CDC price category.



"MATHEMATICS" (in caps) is a broad subject heading

```
  SUBJECTS
1 Decimals
    --for elementary students
2 Fractions
    --for elementary students
3 Number lines
    --for elementary students
4 Elementary students
    Decimals --for elementary students
5 Elementary students
    Number lines --for elementary students
6 ACADEMIC LIBRARY
    Mathematics, elementary
7 Elementary students
    Fractions --for elementary students
8 MATHEMATICS, elementary.  Academic library

  Option (a#,r#,d#,f,b):  »
```



```
   SUBJECTS
 9 Mathematics
     --games
10 Games
     Mathematics





   Option (a*,r*,d*,f,b):  >
```

This is the first page of the lesson itself.

DARTS

Sharon Dugdale
David Kibbey
Barry Cohen

Press NEXT to play
HELP to see the rules
DATA for information

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The on-line catalog uses a database manager developed specifically for this application. The catalog is designed to be accessible to any user of the PLATO system and thus must be "user friendly." It is electronically linked to identical databases on other PLATO systems, and updating takes place on a daily basis.

Customers who work with the catalog deal with some issues that are perhaps similar in nature to those faced by the user of a conventional library. The courseware library, like the conventional library, may not have all the materials a customer would like. The customer must work with the available indices to the courseware library, similar to the conventional library's card catalog, to locate the desired materials.

But, unlike the user of a conventional library, the customer must use a computer terminal and an on-line catalog to locate materials. A new customer is likely to use the catalog soon after learning to sign on to the system, and the catalog is an excellent tool for learning one's way around the system. It is important that the catalog be easy to learn for a customer who may never have used a computer system before.

The PRECIS system has been used for the on-line catalog since its inception. It was chosen over other systems such as Library of Congress for a variety of reasons, including undoubtedly the fact that the librarian who made the decision was familiar with PRECIS through work she had done in India. Some of the other reasons for the choice are perhaps more valid:

PRECIS was developed specifically to take advantage of the use of computers, a particular consideration in our situation.

Research indicates that PRECIS can be adapted for languages other than English. PRECIS is currently used actively in French, and its use has been demonstrated in German, Danish, and Polish. Since the PLATO system is used all over the world, the multi-lingual capabilities of PRECIS were an important factor.[2]

PRECIS headings are developed using a system of logic based on rules of grammar and syntax. These "rules" for developing headings can be applied in a variety of situations, and indexers working separately have been shown to have developed remarkably consistent subject headings.[3]

PRECIS subject headings are developed based on the subject of the item being indexed, and the indexer is not required to work within a certain set list of subject headings. Subject headings can be added without limit, an important advantage for indexing a relatively new field like computer-based education.

- PRECIS is not widely used or taught in the US. It is therefore difficult to obtain training, and librarians trained in PRECIS are few and far between.
- Indexing in a consistent, coherent manner is a difficult task. The indexer's knowledge of the world is certainly not complete, and the vocabulary of the searcher and indexer are not likely to match.
- Our courseware is heavily concentrated in certain areas, particularly computer-related subjects, that require special subject matter knowledge for indexing.
- The PRECIS index in the on-line catalog is the only subject index of courseware available. PRECIS is not by nature a broad hierarchical sy[illegible], and users frequently

express a wish to look at broad subject categories, particularly when browsing, rather than the specific headings of PRECIS.

- Use of the PRECIS system results in more entries for each item in the catalog than other commonly used systems, such as Library of Congress. This requires more computer storage space and may well result in longer retrieval times. More entries per item, however, increase the likelihood of the customer locating an item under a variety of subject headings.

POOR

QUALITY

ORIGINAL